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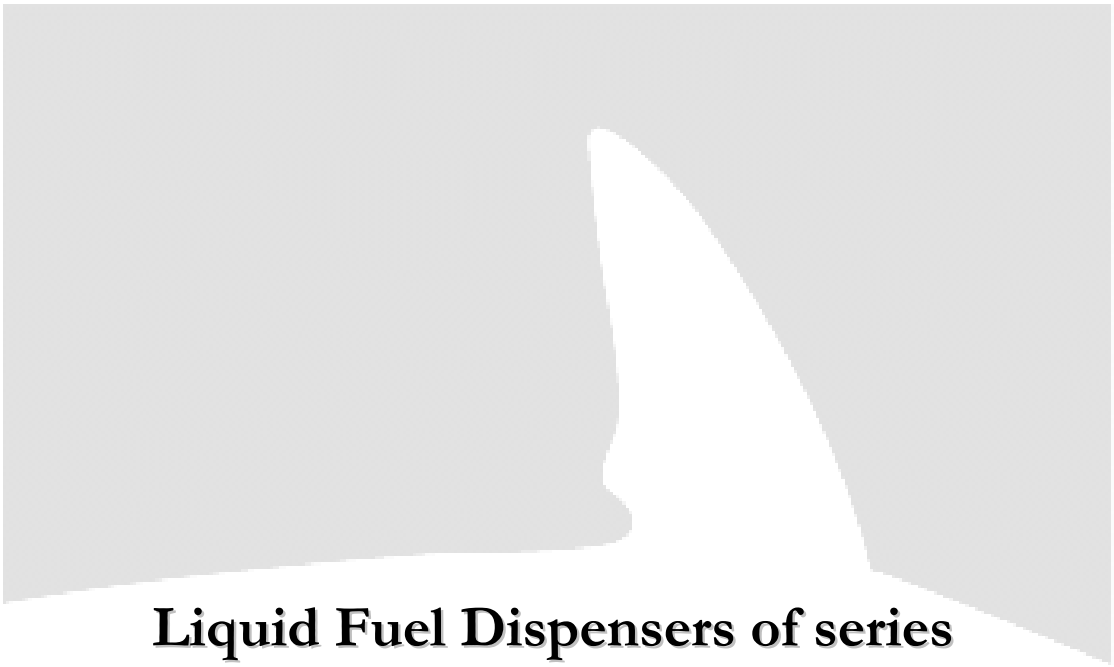

Liquid Fuel Dispensers of series BMP500.S and BMP2000.S version SHARK

Installation and User Manual

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INSTALLATION AND USER MANUAL

Liquid Fuel Dispensers of series BMP500.S and BMP2000.S version SHARK

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TATSUNO Benč

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0. Introductory Information

0.1. Pictograms and Terms Used in the Manual

Symbols used in the Manual:

Caution

Explosion hazard

Caution - Electric equipment

No smoking

No open fire

No mobile phones

The terms used in the Manual which special attention should be paid to:

1) CAUTION

Breach of requirements shown under the heading can result in creation of the conditions leading to injury or death of persons or to material damage to property.

2) WARNING

Breach of requirements shown under the heading can lead do injury of persons and/or can result in fuel dispenser damage.

3) ATTENTION

The text shown under the heading draws attention to the mandatory and/or statutory requirements which assembly and use of the fuel dispenser is governed by. Breach of these requirements can create dangerous situation and/or can result in fuel dispenser damage.

4) NOTE

The text shown under the heading draws attention to the assembly procedures, processes and operating methods, etc., which are important for correct assembly and correct fuel dispenser operation and which, when breached, can result in damage, failure or bad fuel dispenser performance.

0.2. Read the Manual Thoroughly First

Read the relevant parts of the Installation and User Manual prior to start installing or operating the fuel dispenser. Consider all hazards, attentions and notes contained in the Manual.

The manufacturer has compiled the Installation and User Manual to grant the necessary information and instructions facilitating complete and effective installation, operation and maintenance of your fuel dispensers of the type series BMP500.S and BMP2000.S.

The Manual elaborated out by the manufacturer is the integral part of fuel dispenser accessories.

The user is liable fully for use of the Manual; any and all operations not described here have to be considered forbidden. The operator carrying such operations shall be liable fully for consequences of his/her actions.

The Manual is arranged in individual sections broken down to the sub-sections so that each topic may be independent and may correspond to the operating logic (learn - prepare - use - maintain).

The Manual reflects truly the technical state as to the date of fuel dispenser sale and cannot be considered non-conforming due to follow-up changes and updating carried out on the basis of the latest fact.

ATTENTION

MAINTAIN THE MANUAL AND ATTACHED DOCUMENTS FOR THE WHOLE TIME PERIOD OF FUEL DISPENSER SERVICE FOR POSSIBLE FUTURE REFERENCES!

0.3. Permitted Scope of Use

The fuel dispensers of the series BMP500.S and BMP2000.S are specified for stationary installation and for vehicle refuelling by petrol, kerosene and diesel oil from the tanks in the preset volume.

CAUTION

The fuel dispenser is a complex device which must fulfill a number of demanding functions. **It is therefore necessary to clean the tanks, pipe distributions and carry out check for fuel purity (dirty filters in the dispenser cannot be considered the reason for warranty repair!) prior to putting the dispenser into operation. Prior to activating, inspection of el. power distribution and check for correct wiring have to be carried out to prevent electric shock and to provide flameproofness (fuels are combustibles of class I).**

Each fuel dispenser has been tested from the points of its function, safety and metrology by the manufacturing plant. Delivery of each individual fuel dispenser is accompanied by the certification documents which shall be submitted to the competent authorities by the user, if asked to do so.

1. Fuel Dispensers TATSUNO BENČ

1.1. Basic Specifications

Fuel dispenser hydraulic unit

Delivered flow rate :	- standard speed	30 ÷50 dm^3/min
	- high speed/H	70 ÷ 90 dm^3/min
	- super speed/S	120 ÷ 150 dm^3/min
Accuracy of dispensing :		± 0.5 % at the minimum delivery of 2 dm^3 (21)
Maximum operating pressure:		0.18 MPa (1.8bar) ; 0.25 MPa (2.5bar) for /H and /UH
El. motor :		three-phase, 3x400V; 0.75 kW; 1395 rpm
Electromagnetic valves :		230V AC; 50 Hz; 5W as a standard
		24V AC; 50 Hz; 5W for Puma HT-TE and Puma MPD
		+24V DC; max.0.500A for proportional valves

Electronic calculator:

Power supply :	~230 V; +10% -15%; 50 Hz ± 5 Hz
Power input :	max. 85 VA
Operating temperature :	- 25°C to +55 °C
	(with low temperature kit -40°C to 55°C)
Relative humidity :	max. 93 % at 55 °C

Displaying units:

a) 7-segment LCD displays with LED back-lighting		(type PDEDIL)
volume		0.01 to 9999.99 dm^3
cash amount		1 to 999999 currency unit
unit (grade) price		1 to 9999 currency unit/ dm^3
figure height	cash amount :	2.54 mm (1“)
	volume :	2.54 mm (1“)
	unit price:	2.54 mm (1“)
b) Alphanumeric LCD displays		(type PDELCD)
volume		0.01 to 9999.99 dm^3
cash amount		0.01 to 99999.9 currency unit
unit (grade) price		0.01 to 99.99 currency unit/dm^3
figure height	cash amount:	40 mm
	volume :	2.54 mm (1“)
	unit price:	2.54 mm (1“)

1.2. Fuel Dispenser Description

The fuel dispensers TATSUNO BENČ, version SHARK, have the body parts (guards, doors, covers…) made of fireproof laminate (reinforced plastic) approved for the scope of use by the State Test Laboratory (Certificate of FTZÚ 04ST 0083). Supporting dispenser skeleton parts are made of steel lacquered sheet 0.8 - 1 mm thick and/or of stainless sheet. Standard colour version of the fuel dispensers TATSUNO BENČ: combination of white (MM710) and grey colour (RAL7040)**.** Each fuel dispenser is equipped by the **hydraulic unit** (dispensing monoblock + flow meter) of the Japanese company **TATSUNO**. We are speaking about the time-tested type of hydraulic unit accepted globally characterized by high reliability and long total service life. The dispensing unit is equipped by the inlet and outlet filter, air and vapour separator, check valve and rotary pump with operating pressure control. The four-piston flow meter can be setup through a single piston. The main shaft of each flow meter is coupled with a high-reliable double-channel photoelectric measuring **pulser** of explosion-protected design (Ex). Each fuel dispenser is equipped by the **electronic calculator** with its own self-checking unit and by the **displays** displaying the dispensed amount, fuel volume in litres and unit price . Displays of the fuel dispensers specified for commercial outlets display only the dispensed fuel volume in litres. The **dispensing**

hoses are made of high-quality rubber resistant to fuel in antistatic version; in most cases they are connected to the self-winding system (see the models of the series BMP2000.SS and BMP2000.ST). The fuel dispensers are delivered with the automatic stop-nozzle of the **ZVA** company (Elaflex) as the standard..

1.3. Survey of Available Type Models

The fuel dispensers TATSUNO BENČ, version SHARK, are manufactured in several type series:

- type series BMP500.S - variant SHARK
- type series BMP2000.SS - variant SHARK with hose retractors and dispenser height of 1600mm
- type series BMP2000.SM - variant SHARK with hose retractors and dispenser height of 1900mm
- type series BMP2000.ST - variant SHARK without hose retractors and dispenser height of 2300mm

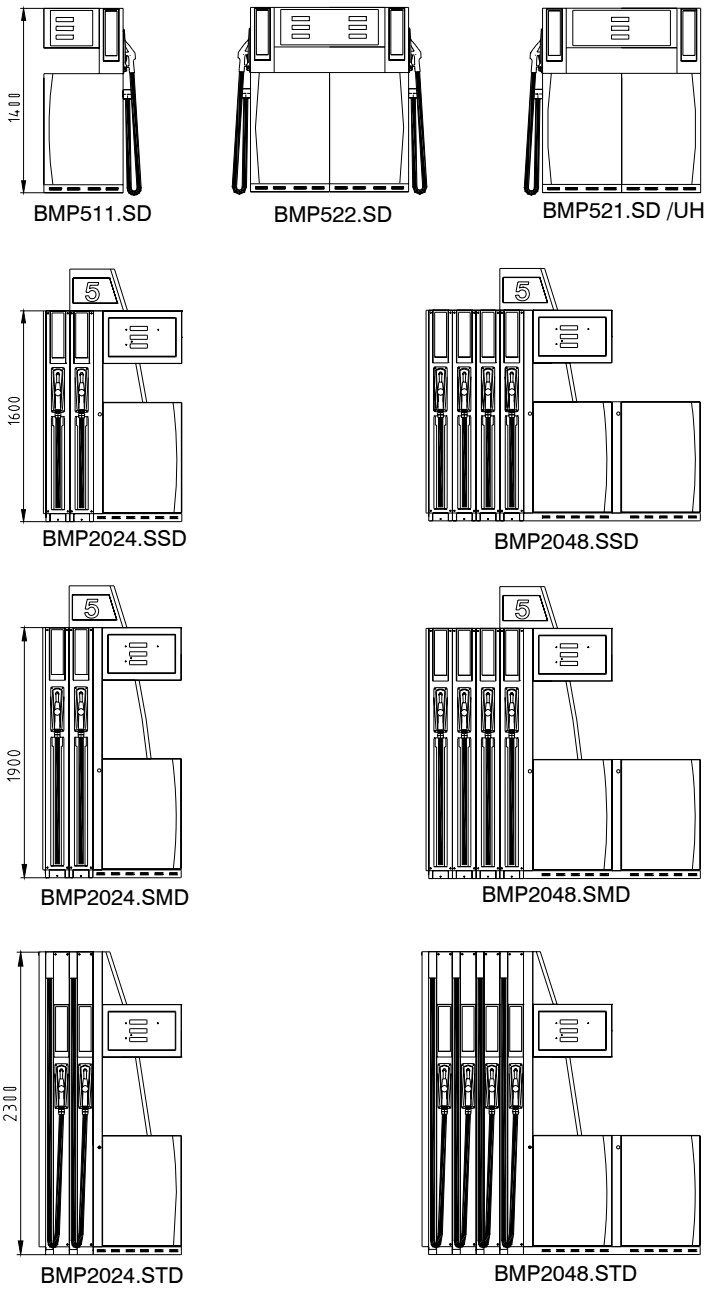


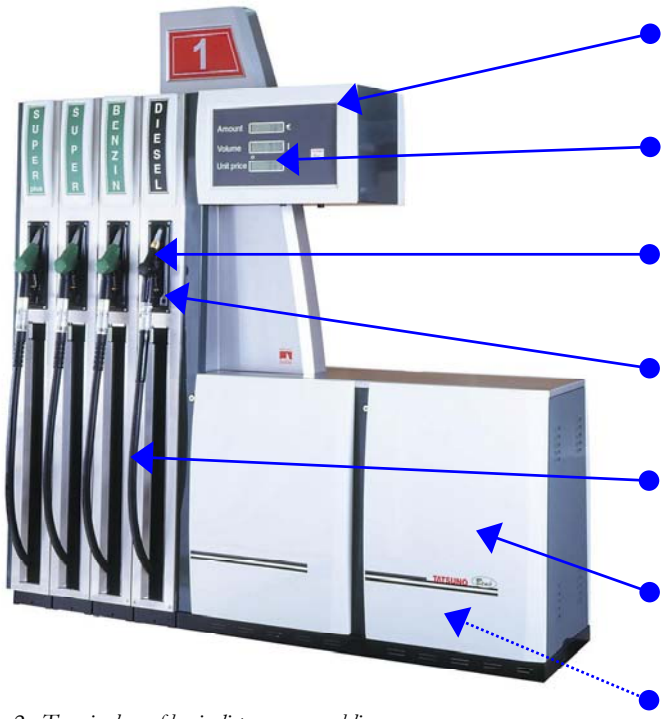
Fig. 1 - Survey of fuel dispenser TATSUNO-BENČ type models, version SHARK ARK

Tables of all variants of fuel dispenser type series are contained in the Appendix B, figures of fuel dispensers can be found in the Appendix E.

Individual dispenser types differ by the following features:

- **Number of dispensing points.** Under the dispensing point we understand that part of the fuel dispenser where the customer can refuel himself independently and separately. Depending on the dispenser type, each dispensing point can be equipped by one to four hoses where the customer can select the fuel grade and by at least one display. Only one fuel grade can be dispensed on one dispensing point at the same time. TATSUNO BENČ dispensers are equipped by one or two dispensing points.
- **Fuel dispenser orientation.** All dispensers can be broken down to *one-sided or double-sided* by their orientation The double-sided dispensers enable car arrival and dispensing from both dispenser sides. One-sided dispensers enable car arrival and dispensing from one dispenser side only. From the point of the car sideway the one-sided dispensers can be broken down to *LH* (hoses are on the left side) and to *RH* ones.
- **Number of fuel products.** Depending on the type, the dispenser can deliver *one to four different fuel products.*
- **Number of hoses (nozzles).** Each dispensing point is equipped by one to four hoses ended by nozzles. The dispenser can thus comprise 1 to 8 hoses**.** .
- **Delivered flow rate.** Under the delivered flow rate we understand the max. available fuel flow through the nozzle. It is shown in dm^3 (litres) per minute. TATSUNO BENČ dispensers accommodate three available speeds: standard speed 35 to 50 l/min., high speed 70 to 90 l/min and super speed 120 to 150 l/min.
- **Type of displays.** All displays can be divided by their type into *displays for commercial outlets (litre displays)* and *displays for retail outlets*. The litre displays contain only the information about the disposed fuel amount in centilitres and are used on the dispensers specified for commercial outlets (i.e. internal corporate filling stations). Besides the information about delivered amount the displays specified for retail outlets also comprise the cash amount and the information about unit grade (fuel product) price.
- **Number of displays.** The number of displays depends on dispenser orientation and on the number of dispensing points. Depending on the type, the dispenser can contain 1 to 4 displays.

1.4 . Terminology of Basic Dispenser Assemblies



dispenser head with control electronic unit

displaying unit

dispensing nozzle

nozzle boot

dispensing hose

door

motors, pumps, vapour separation (recovery), flow meters, pulsers, junction boxes

Fig. 2 - Terminology of basic dispenser assemblies

1.5. Rating Plate

Fig. 3 - Rating plate layout

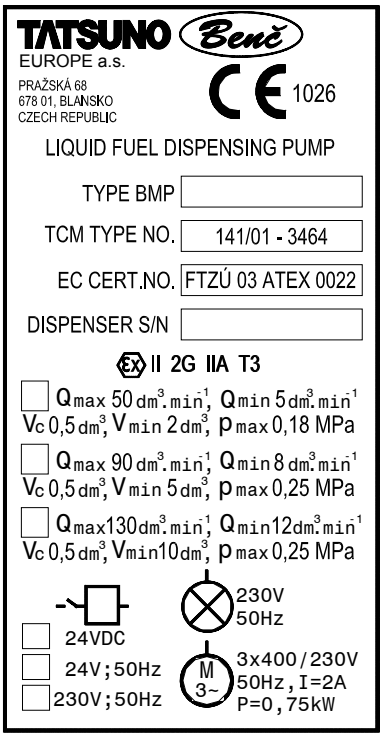


Fig. 4 - Rating plate

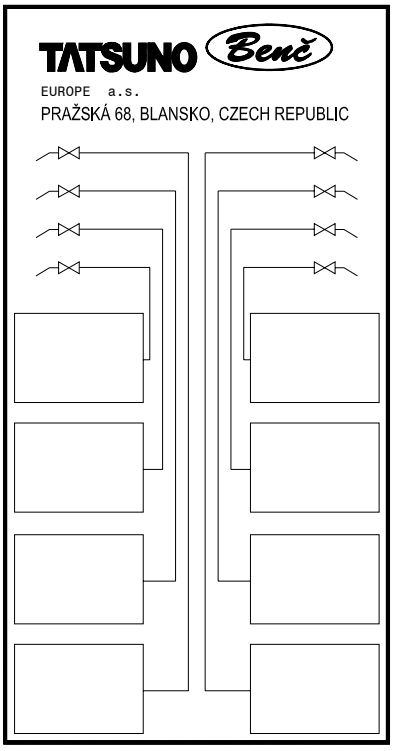


Fig. 5 - Information plate, layout of measuring pulsers and nozzles for fuel dispensers of type model BMP2000.ST

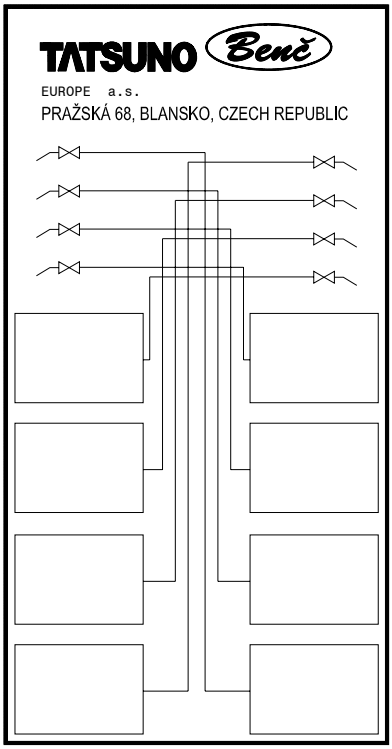


Fig. 6 Information plate, layout of measuring pulsers and nozzles for fuel dispensers of type model sBMP2000.SS and BMP2000.SM

Information on the Rating Plate

TATSUNO-BENČ EUROPE a.s.	Name and address of fuel dispenser manufacturer
CE 1026	Designation of the dispenser means that it has been designed, manufactured and marked in conformity with European Commission Directives. The dispenser is subject to certification of type retesting pursuant to the Directive 94/9/EC – ATEX, carried out by the Notified Body No. 1026 – FTZÚ Ostrava Radvanice (see EC Certificate of Conformity - Appendix K)
LIQUID FUEL DISPENSING PUMP	Scope of use of the device
TYP BMP	Designation of fuel dispenser type (see the Appendix B)
TCM TYPE NO.	No. of the Certificate of dispenser type approval - ČMI (Czech Institute of Metrology)
EC CERT. NO	No. of the European Certificate of the type – FTZÚ Ostrava-Radvanice (see Appendix K)
Q_{max} 50, 90 or 130 [$dm^3.min^{-1}$]	Hydraulic and metrologic parameters
Ex II 2G IIA T3	Marking of explosion-protected el. equipment: • II 2 – equipment for explosion hazard rooms other than the mines, probability of creation of the explosive atmosphere - zone 1 • G – explosive atmosphere created by gases, vapours or mists • IIA – gas group – least dangerous • T3 – max. temperature of el. equipment which might cause ignition of the ambient atmosphere (200°C)
DISPENSER S/N	Serial number of the fuel dispenser (order number /year of production)
motor power supply	3x400/230V; 50Hz; P=0.75kW; I=2A
valves power supply	230V; 50Hz or 24V; 50 Hz or 24V DC
power supply of the lighting	230V; 50Hz

2. Installation

2.1. Occupational Safety Instructions

CAUTION

- **The equipment has to be installed by the staff qualified and authorized pursuant to relevant standards, regulations, local limitations and pursuant to the Manual.**
- **Smoking and open fire handling is prohibited in the vicinity of the dispenser.**
- **Always adhere to the rules for petrol and diesel oil handling.**
- **Monitor all leaks in the dispenser. Should you establish fuel leaks, disconnect power supply line and contact the service organization.**
- **El. wiring must be carried out by the qualified staff.**
- **Assure that the operable fire extinguisher is available.**

When handling the device, use suitable protective aids.

2.2. Arrival, Transportation, Unpacking

The customer shall agree the method of dispenser dispatch with the manufacturer. Should the transportation be provided by the company TATSUNO-BENČ EUROPE a.s., the product will be transported to the agreed place of destination. The manufacturer has adequate knowledge of the method of transportation and handling. Should the transport be provided by another method selected by the customer, the manufacturer shall provide professional loading, but is not liable for the method of transportation. It is established in general that the fuel dispenser must be transported packed dully, always fixed on the frame. The dispenser must be fixed on the vehicle and protected from damage (guards, paints), displacement and overturning. Handling and transportation must be done in vertical position only, the dispenser may not be put on the guards.

WARNING

When handling the dispenser, only and exclusively high-lift trucks may be used. TATSUNO-BENČ EUROPE a.s. is not liable for possible damage, if other handling devices are used !

2.3. Fuel Dispenser Installation

2.3.1. In General

The manufacturer recommends to install the liquid fuel dispensers TATSUNO BENČ on filling station islands so that the direction of car arrival to the dispenser may conform with the arrow (see the Appendix E). Product numbering can also be found in the Appendices F and H.

2.3.2. One-sided Dispenser Orientation

One-sided dispensers are marked by block letters "L" a "R" ("L"-left-hand and "R"-right-hand) after designation of fuel dispenser type (e.g. BMP2044.SSL - left-hand one-sided four-product dispenser, variant 1600 mm). Dispenser orientation is determined by viewing the dispenser of the direction of car arrival.

2.3.3. Distance of Fuel Dispenser from Tank

The manufacturer recommends the **50 meter** maximum distance of the dispensers from the fuel tanks and the lifting head up to **5.5 meters**. Differing conditions can lead to impaired suction ability of the dispenser which results in reduced pump capacity (flow rate). Any and all technological requirements for the filling station must be resolved by the professionally processed and approved design of the filling station consulted with the fuel dispenser manufacturer.

The manufacturer recommends at least **1 meter** distance of the one-sided fuel dispenser from the wall.

2.3.4. Fuel Tank Type

Fuel dispenser(s) can be connected both to underground tanks and to the aboveground tanks.

The steel base frame shall be leveled and seated into concrete on the shaft which the suction piping of the reservoir tank leads from. The base frame is out of scope of fuel dispenser delivery. The dispenser is mounted on the frame. The following supply cables must be led into the shaft under the fuel dispenser, in addition to the conductor for connection of the grounding system:

- for three-phase el. motor feeding - the four-conductor cable **CMSM 4B x 1,5**
- for feeding of calculator and switching circuits - the five-conductor cable **CMSM 5C x 1**
- communication line - shielded cable **CMFM 4D x 1**

It is possible to mount the fuel dispenser on the ECO drip tray, replacing the base frame and preventing oil product leaks.

ATTENTION

Supply lines to the fuel dispenser must be sealed perfectly to prevent penetration of inflammable liquids or their vapours inside the dispenser. Only the cable terminals resistant to flammable liquids may be used in the shafts under the dispensers. Cable bushings may be used for one cable only, unless their design is specified for more cables.

CAUTION

If the fuel dispenser is connected to the **underground tank**, the check valve must be inserted in the suction piping; the check valve must reliably prevent break of the fuel column at fuel dispenser rest and subsequent air suction after start of refueling. **The separate check (non-return) valve may not be installed, if the suction strainer is already equipped by the non-return valve (see. Fig. 7).**

CAUTION

If the fuel dispenser is connected to the aboveground tank, then it is necessary to incorporate the **relief (safety) valve** into the suction piping (for safety purposes) which guarantees that the dispenser pump generates the negative pressure of ca -0.03 MPa. We recommend the valve type **V316.XX**. The valves are manufactured by the company ZPA Slavičín. The lowest pipe point should accommodate the **closing and drain valve** which should be closed by the filling station operator whenever the fuel dispenser is out of operation. In case of non-existence of this valve any pipe system leak may result in uncontrolled **fuel leakage (see Fig. 8).**

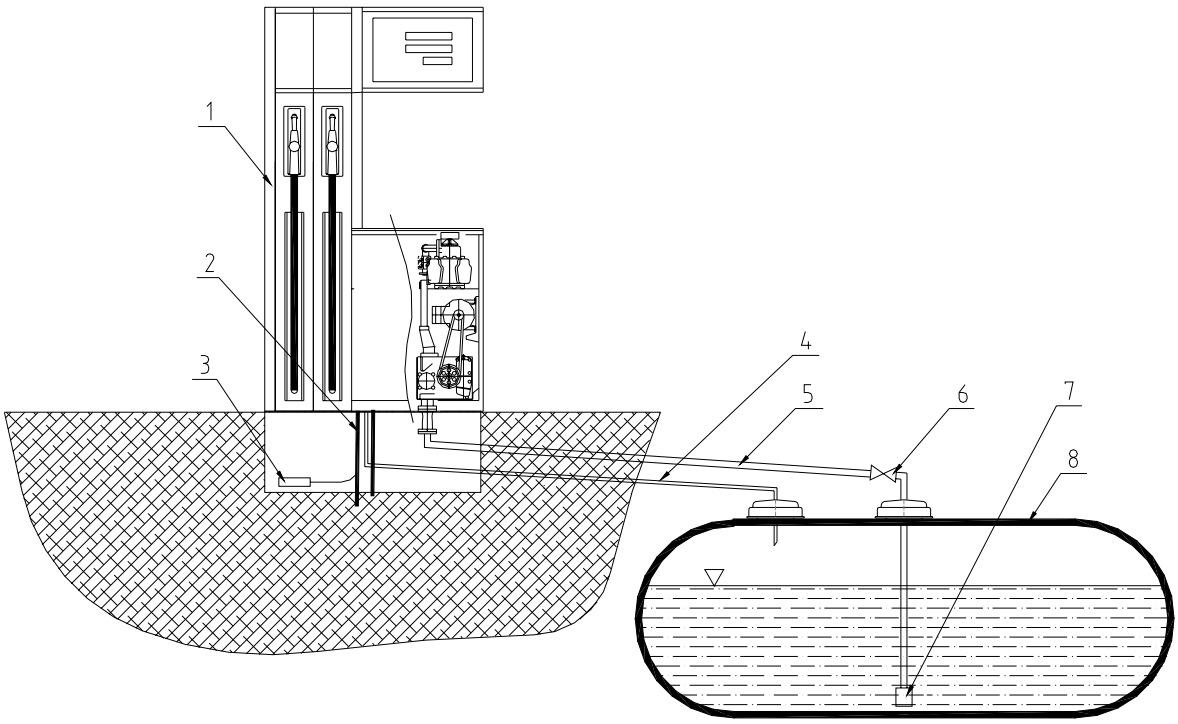


Fig. 7 - Fuel dispenser installation- underground tank

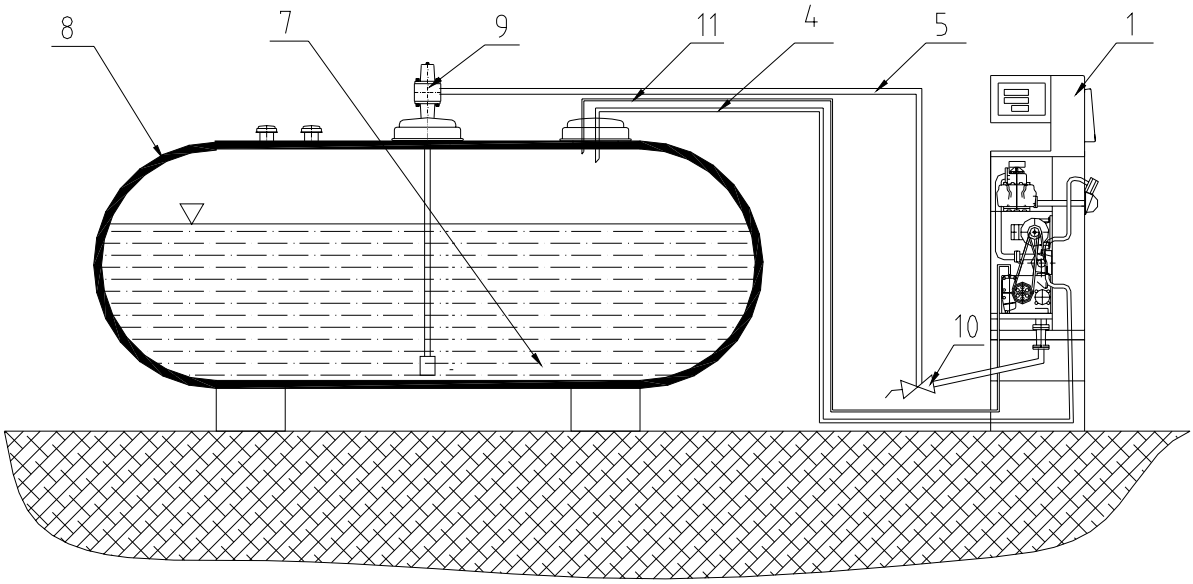


Fig 8 - Fuel dispenser installation- aboveground tank

Pos.	Description	Pos.	Description
1	Fuel dispenser	6	Non-return valve
2	El. supply cables and communication line	7	Suction strainer (without non-return valve)
3	Liquid sensor placed on the drip tray bottom	8	Fuel tank
4	Piping of return vapour removal (recovery)	9	Non-return relief valve
5	Suction fuel piping	10	Drain and closing valve
		11	Return pipe from fuel dispenser air separator

ATTENTION for aboveground tanks

Pumping monoblock is designed with pernamently open air separator into separator room. On upper side of the cap is DN6 connection for pipe of separated air. To prevent fuel leakage into the dispenser it is necessary to **interconnect separator outlet of the pumping monoblock with fuel tank (fuel reservoir).** Interconnection is possible to make by pipe Ø 10 x 1 (DN8). Pipe interconnection is fasted through sealing M12x1.5 in upper wpart of the monoblock cap. Pipe outlet is necessary to lead on into fuel tank cap via pipe connection DN8 **(see. Fig 8a).**

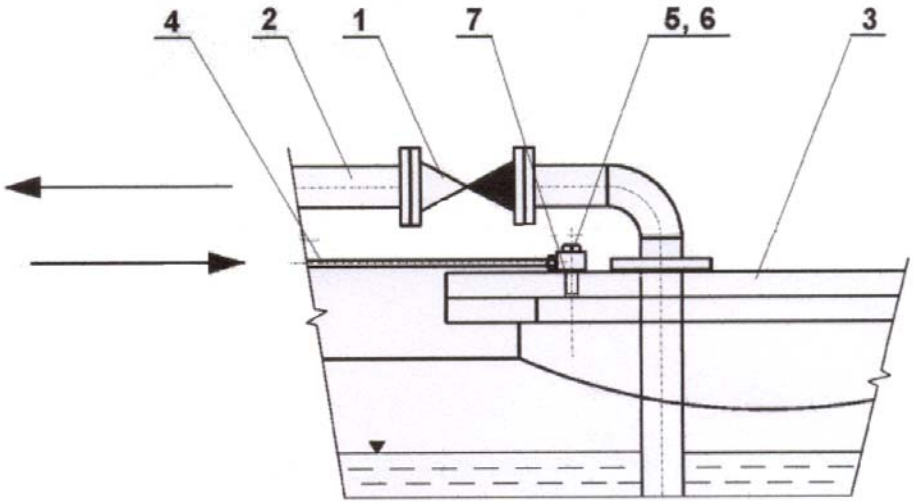


Fig. 8a - Example of interconnection between dispenser and aboveground tank

Poz.	Popis
1	Pressure back valve (DN according the suction pipe)
2	Suction pipe from tank DN40 (Q = 40 $dm^3.min^{-1}$) or DN50 (Q = 80 - 130 $dm^3.min^{-1}$)
3	Tank cap
4	Return pipe Ø 10 x 1 (DN8) from air separator of the dispenser pumping monoblock
5	Pipe interconnection DN8
6	Sealing ring 14 x 18
7	Sealing ring 12 x 16

2.3.5. Pipe Distributions

The fuel dispenser manufacturer recommends to carry out the pipe distributions by the standard method, i.e. a separate piping leads into the relevant fuel tank from each pump.

NOTE

There is also the so called backbone pipe system distribution available, i.e. more dispensers (pumps) are connected to a single supply piping from one tank. The fuel dispenser manufacturer **does not recommend** the backbone pipe system distribution due to possible instability which can occur during fuel suction from the tank. If the designer nevertheless selects the backbone pipe distribution, then the fuel dispenser manufacturer requests incorporation of the **disk valves (C09 DN32 type**) into the suction piping which will separate individual dispensers. The disk valves are manufactured by the company Armatury Group a.s. Kravaře.

2.3.6. Dispenser Installation by Environmental Effects

ATTENTION

Dangerous zones are determined according to CSN EN 60079-10 round the fuel dispenser.

Dispensers of series BMP500.S and BMP2000.S **may not be** placed in the dangerous zone. El. calculators, used in these dispensers are of uncased (unenclosed) version, are placed in the explosion-protected zone and separated from all other zones by the partition of type 1 according to CSN EN 13617-1.

2.3.7. Pressure System

The fuel dispenser (s) can be connected not only to the system with classic suction, when the fuel is sucked from the tanks, using the pumps placed in the dispensers, but also to the **pressure system**, where the fuel is "pushed" into the dispenser directly from the tanks where the central pumps are installed (e.g. the system RED JACKET). Advantage of the pressure system - very quite dispenser run, disadvantage - high demands to quality and tightness of the fuel piping. In case of the pressure system the fuel dispenser is not equipped by the pumping monoblock (unit). The fuel piping is connected through the breakaway valve placed under the dispenser. From hence the fuel is led into the filter and distributed through the meters and control valves into the dispensing hoses and nozzles.

CAUTION

The fuel dispenser TATSUNO BENČ **is not equipped by the breakaway valve as a standard for the pressure system**. The fuel inlet into the dispenser is realized by the union nut with the inner thread G1". Position of the inlet pipe can be seen in the Appendix I, where are two examples of interconnection.

Besides the conductor for connection of the grounding system the following supply cables must be led into the shaft under the fuel dispenser:

- for feeding of three -phase el. motors - the four-conductor cable **CMSM 4B x 1,5**
  (the dispensers equipped by vapour recovery - only exhaust vacuum pump el. motors are supplied by the cable)
- for switching of pump el. motors installed inside the tanks - the seven-conductor cable **CMSM 7C x 1,5**
- for feeding of calculator and switching circuits - the five-conductor cable **CMSM 5C x 1**
- communication line - shielded cable **CMFM 4D x 1**

Connection of the fuel dispenser to the pressure system - see the Appendix I.

2.3.8. Satellite to Fuel Dispenser

The so called satellite can be connected to all fuel dispensers of series BMP500.S and BMP2000.S. We are speaking about the complementary dispensing point - the dispenser with a hose and a flange, installed on the opposite traffic island side. The satellite is used particularly for truck refueling, i.e. the both side tanks of truck can be filled simultaneously by the hoses of the main dispenser ands the satellite. The satellite dispenser is not equipped by any control electronics and hydraulic system and depends fully on the main fuel dispenser. Figure of the satellite, its foundation plan and the base frame can be found in the Appendix F.

2.4. Mechanical Fuel Dispenser Mounting

The fuel dispensers are fixed to the special base frames by the anchor bolts delivered with the dispenser. The base frame is out of scope of standard dispenser equipment, but can be ordered additionally. The base frame is seated into the concrete on the island, then the front and read fuel dispenser casings are removed, the dispenser is placed on the base frame and fixed by the fixing screws.

The dispenser is then connected to the suction piping by the interconnecting piece, being the integral part of fuel dispenser delivery.

The Appendix F shows the base frames and foundation plans of all fuel dispenser type models with marked position of the suction piping and piping for back suction of petrol vapours from the dispenser. The discharge vapour recovery piping is connected with the cover piping G 1".

NOTE

The cover G 1" is the integral part of fuel dispenser delivery. The **recovery piping must end by the female thread G1".**

2.5. Fuel Dispenser El. Wiring

El. wiring of fuel dispensers TATSUNO BENČ requires protection against accidental el. shock (pursuant to the standard CSN 33 2000-4-41 „El. Engineering Regulations - El. Equipment - Part.4. Safety - Section 41: Shock Protection", published: February 2000, in force since: 2000.03.01, catalogue No.: 55509, Harmonization: Determined - Government Decree No 163/2002 Coll., Bulletin - 2002.Z2) and laying of relevant el. cables for each individual fuel dispenser.

All fuel dispensers in the filling station shall be interconnected by the conductor earth electrode and connected to the grounding network. The yellow and green conductor, section of min. **4 mm²** or a special ribbon conductor can be used as the conductor earth electrode. The conductor earth electrode must be connected to the central grounding terminal of the fuel dispenser placed on the foundation (screw M10), marked correspondingly.

ATTENTION

All el. cables must be resistant to petrol vapours and must have good insulating properties, because they are subject to aggressive explosion-hazard environment for a long time period. For these purposes the manufacturer recommends the cables of CMSM and CMFM types (cables resistant to petrol vapours). An example of fuel dispenser el. wiring - **see the Appendix G**.

NOTE

Ends of all cables entering the fuel dispenser must be long enough to facilitate installation (cable termination in the junction box) - each cable must end at least **3 m** above the ground.

From the point of applied voltage and function the cables can be broken down to power and signal ones.

Power cables:

- pump and vacuum pump el. motor feeding
- feeding of calculator and switching components

Signal cables:

- communication line
- complementary service lines (pulse outlets, motor interlocking, etc..)

2.5.1. Feeding of Pump and Vacuum pump El. Motors

Feeding of pump and vacuum pump el. motors of all fuel dispenser type models is carried out by the 4-conductor cable **CMSM 4B x 1.5**, distributed from the main switchboard in the kiosk to each individual fuel dispenser - into the junction box (see Appendix G). In the switchboard the cable is connected to the fuses and a switch. Switching of individual pump and vacuum pump motors is done by the contactors inside the fuel dispenser.

Single-product fuel dispensers with one el. motor (i.e. all fuel dispensers of series BMP511.S, BMP2011.SS, BMP2012.SS and related type models) are equipped by the contactors only and **do not contain the current motor protection**. Motor of these fuel dispensers must be protected suitably in the switchboard. It is recommended to use the motor circuit breaker of the PKZM 0-2,5 type, produced by the company Moeller

Klockner. After installation into the switchboard door, the circuit breaker can be completed by the control head (IP65) with extended shaft.

Multi-product fuel dispensers and fuel dispensers with more than one el. motor (i.e. the fuel dispensers BMP522.S, BMP521.S/UH, all high-speed and multi-product fuel dispensers of series BMP2000.S) are equipped by the contactors and each motor is protected by the thermal current protection. Switching of pump and vacuum pump motors is carried out so that max.. two pump and two vacuum pump motors are at any time connected to the supply power cable.

Marking of conductors in cable CMSM 4B x 1,5		
marking	**colour**	**description**
L1	black	phase 1
L2	brown	phase 2
L3	black	phase 3
PE	yellow and green	protective conductor

Table 1 - Feeding of pump and vacuum pump el. motorsy

ATTENTION

It is recommended to use a special motor circuit breaker or **PKZM 0-10** type, produced by the company Moeller Klöckner, for termination of the supply cable 3x400 V in the switchboard. The circuit breaker serves as the switch and contains short circuit and thermal protection. After installation into the switchboard door, the circuit breaker can be completed by the control head (IP65) with extended shaft - type RH-PKZO.

NOTE

Motor contactors **DIL EEM-10** and **DIL EM-10-GI** with thermal current protections of **ZE-2,4** and **ZE-0.6** types of the company Moeller Klöckner and/or motor circuit breakers of **PKZM 0-0.4** type of the same manufacturer are used for switching of pump and vacuum pump motors in multi-product fuel dispensers. Fig. 4 shows the tripping characteristics of used current protections of the ZE type of the company Moeller Klöckner.

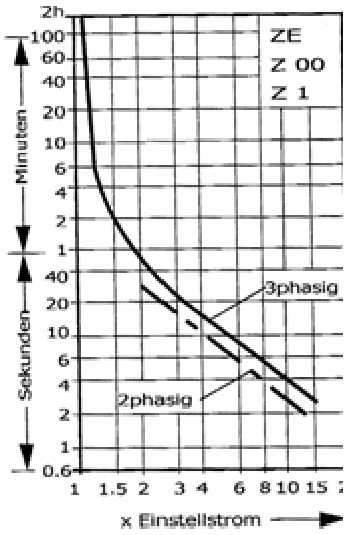


Fig. 4 - Tripping current protection characteristics of type ZE Moeller Klöckner

Types of used el. motors

The following four el. motor types are used for all fuel dispensers of series BMP500.S and BMP2000.S:

Pump el. motor variant 1	Pump el. motor variant 2	Vacuum pump el. motor - variant 1	Vacuum pump el. motor - variant 2
asynchronous motor	asynchronous motor	asynchronous motor	asynchronous motor
type 1MA7083-4BA10	type V80 TL4PR	type ERFY 0.09/2-71	type BA240TRII AR-R
230/400V; 50Hz	230/400V; 50Hz	230/400V; 50Hz	230/400V; 50Hz
current 2.05 A	current 2.2 A	current 0.35 A	current 1.0 A
power input 0.75 kW	power input 0.75 kW	power input 0.12 kW	power input 0.37 kW
1395 rpm	1410 rpm	2765 rpm	2850 rpm
Ia/In = 4,8	with thermal protection	Ia/In = 4,2	with thermal protection
IP 55	IP54	IP 54, VDE 0530/84	IP 54
T3, t_E = 16 sec	T3	T3, t_E = 40 sec	T3
cos φ = 0,75	cos φ = 0,72	cos φ = 0,78	cos φ = 0,75
Ex II 2 G EEx e II T3	Ex II 2G EEx d II B T3	EEx e II T3	Ex II 2G EEx d IIB T3
PTB 01 ATEX 3259	CESI 03 ATEX 023X	PTB Nr. EX-80/3422	ISSeP02 ATEX 029
Manufacturer: Siemens Elektromotory sro	Manufacturer: RAEL motori elettrici S.r.l.	Manufacturer: ATB Flender	Manufacturer: ELNOR motors n.v.

Table 2 - Types of used el. motors

ATTENTION

When connected, check the motor for correct direction of rotation (according to the marked arrow !)

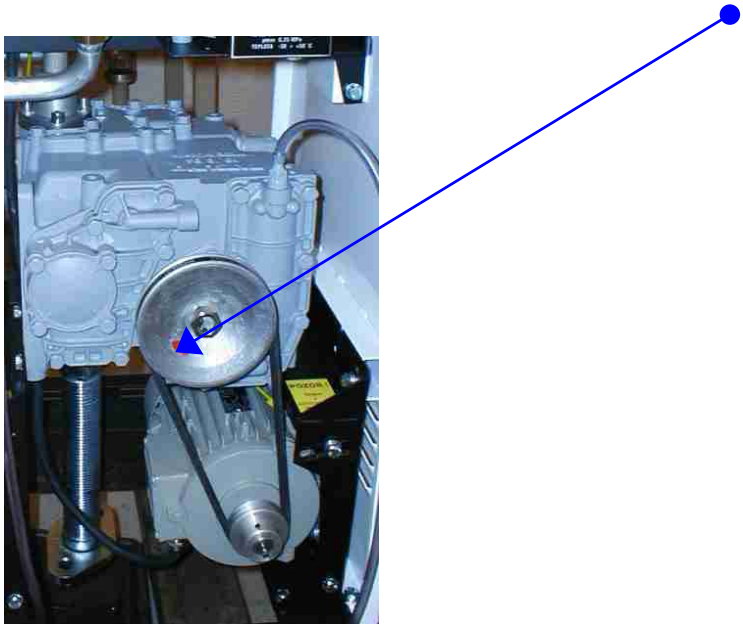


Fig. 5 - Direction of rotation of the pump motor

2.5.2. Feeding of Electronic Calculator, Switching Elements

The stabilized feeding of electronic calculator and non-stabilized feeding of switching elements is separated in all fuel dispensers, where the electronic calculator PDE (TATSUNO-BENČ EUROPE a.s.) or the calculators ADP and ADPMPD (BETA Control s.r.o.) are used.

Feeding of the calculator and switching circuits is done by the 5-core cable **CMSM 5C x 1.5**, which is always led from the main switchboard in the kiosk onto the first dispenser module in the junction box (wiring of junction boxes - see the Appendix G). The cable contains stabilized calculator feeding and non-stabilized switching element feeding (and/or auxiliary heating bodies).

The 3-core cable **CMSM 3C x 1.5** (Ls,Ns,PE) which is led from the main switchboard in the kiosk always into the junction box of the fuel dispenser (wiring of junction boxes - see the Appendix G) is enough for feeding of the calculator in the fuel dispensers where the calculators of PUMA HT-TE or PUMA MPD type of the company Gilbarco Veederoot are used.

Marking of conductors in cable CMSM 5C x 1.5		
marking	**colour**	**description**
Ns	black 2 - light blue	neutral wire of stabilized calculator feeding
Ls	brown	phase 230V of stabilized calculator feeding
Nt	light blue	neutral wire of switching elements feeding
Lt	black 1	phase 230V - switching elements feeding
PE	yellow and green	protective conductor

Table 3 - Feeding of calculator (PDE, ER-4), switching elements

Marking of conductors in cable CMSM 3C x 1.5		
marking	**colour**	**description**
Ns	light blue	zero conductor of stabilized calculator feeding
Ls	brown	phase 230V of stabilized calculator feeding
PE	yellow and green	protective conductor

Table 4 - Feeding of calculator (Puma HT-TE, Puma MPD)

Feeding of switching elements 230V is led from the fuel dispenser into the main switchboard, where it is connected to the phase 230V through the circuit breaker (230V, 2A).

Feeding of calculator is led from the fuel dispenser into the main switchboard, where it is connected to the common bus bar for all fuel dispensers through the circuit breaker 230V (230V, 2A). From hence feeding for all fuel dispensers is led into the stabilized standby source, which will feed the fuel dispenser calculator for min. 3-5 minutes in case of power drop-out. The stabilized source is fed by 230V through the circuit breaker (230V, 10A).

NOTE

It is necessary to separate zero conductors in the switchboard from switching component feeding and from stabilized calculator feeding (a separate zero bridge).

2.5.3. Communication Line

The communication line serves for remote fuel dispenser controlling in the so called automatic mode (i.e. the dispenser is controlled remotely by the console or computer). The line need not be installed if the dispenser is operated in the manual mode only..

ATTENTION

For the communication line at least the four-core shielded communication cable of the min. cross conductor section of 0.5 mm² must be used !! Cable sheath must be of self-extinguishing design, resistant to petrol vapours. The 4-core shielded cable **CMFM 4D x 1.5** can be used as the communication line; the cable is distributed from the operator's workplace in the kiosk into communication junction boxes of the dispensers (wiring of communication boxes for individual electronic calculator types - see the Appendix G).

Communication Line Wiring

The method of wiring of the communication line from the kiosk to the fuel dispenser and its connection to the junction box depends on the type of the calculator used in the dispensers and therefore it is necessary to know

the type of the calculator to be used in the fuel dispensers. The electronic calculator **PDE** of the company TATSUNO-BENČ EUROPE a.s is installed in all dispensers as the standard. The calculators **ADP** and **ADPMPD** of the company Beta Control or the calculators **PUMA HT-TE** and **PUMA MPD** of the company Gilbarco Veederoot can be used as a variant. If the interface **IFSF-LON** is used for communication with the fuel dispensers, then connection and wiring of the junction box is identical with connection for the calculator PDE.

Marking of conductors in cable CMFM 4D x 1,5 – Calculator PDE		
marking	**colour**	**description**
A	brown	communication line A (+5V DC) or NET A (IFSF LON)
B	light blue	communication line B (-5V DC) or NET B (IFSF LON)
-	black 1	not used
-	black 2	not used
ST	shielding	cable shielding

Table 5 - Communication cable – calculator PDE

Marking of conductors in cable CMFM 4D x 1,5 – Calculator ADP or ADPMPD		
marking	**colour**	**description**
D(-)	brown	communication line DATA(-)
D(+)	light blue	communication line DATA(+)
0V	black 1	signal ground
-	black 2	not used
ST	shielding	cable shielding

Table 6 - Communication cable – calculators ADP and ADPMPD

Marking of conductors in cable CMFM 4D x 1,5 - Calculator Puma HT-TE or Puma MPD		
marking	**colour**	**description**
TX	brown	communication line TX
RX	light blue	communication line RX
AM	black 1	signal Auto/Manual
0V	black 2	signal ground
ST	shielding	cable shielding

Table 7 - Communication cable – calculators Puma HT-TE and Puma MPD

There are two basic methods of wiring of the communication line between individual fuel dispensers and the control unit (computer) in the filling station:

a) ***Series connection*** (fuel dispensers with PDE, ADP/M and ADPMPD/M calculator) – the communication cable is led from the point of the control computer in the kiosk (service panel) into the communication junction box of the first dispenser. From hence the cable is led into the junction box of the next dispenser, etc. until all dispensers in the filling stations are interconnected. A single communication line is necessary for interconnection of all dispensers in the station.

b) ***Star ("Y") connection*** (fuel dispensers equipped by the calculator Puma HT-TE and Puma MPD) – the communication cable is led from the point of the control computer in the kiosk (service panel, concentrator) star-like into the communication junction boxes of all dispensers. The number of communication lines, necessary for interconnection of all fuel dispensers, equals to the number of fuel dispensers in the filling station.

2.5.4. Service Lines

The service lines serve for special purposes. The lines are not necessary for operation of the dispenser, but are used, if certain dispenser functions need to be controlled remotely or if certain signals have to be led out of the dispenser. Necessity of installation of the service line shall always be consulted with specialists of the company

TATSUNO-BENČ EUROPE a.s. Multi-core shielded cables CMFM (1.5 mm²) are recommended for the service lines

2.5.5. Characteristic Features of the Cables

Cable type	Function	Number of wires	Rated current [A]	Color version of wires	Possible equivalent
CMSM 4B x 1,5	motor feeding	4	17	ZŽ, Č, H, Č	CMSM 4B x 2,5
CMSM 5C x 1,5	calculator feeding PDE, ADP or ADPMPD	5	15	ZŽ, 3 x Č, SM	CMSM 5C x 2,5
CMSM 7C x 1,5	pump switching in the tanks (pressure system)	7	11	ZŽ, 5 x Č, SM	CMSM 5C x 2,5
CMSM 3C x 1,5	calculator feeding PUMA HT-TE, PUMA MPD	3	18	ZŽ, H, SM	CMSM 3C x 2,5
CMFM 4D x 1,5	communication line	4	16	Č, Č, H, SM	CMFM 4D x 2,5

Table 8 Characteristic features of cables

ZŽ - yellow and green
H - brown
Č - black
SM - light blue

RECOMMENDATION

The pulse overvoltage can occur in any line due to lightning - up to the distance of several kilometers - or due to industrial activities. The pulses arisen by lightning induction are quite enough for full destruction of the electronic unit. For this purpose the advanced countries usually apply the overvoltage protection, leading the overvoltage pulse energy away into the earthing conductor, thus protecting the unit in question. Therefore the manufacturer of the fuel dispensers recommends to protect the main (and/or the secondary) switchboard, feeding the fuel dispenser, electronic unit (computer, POS, etc.) and the data lines by overvoltage protection and lightning arresters.

RECOMMENDATION

In order to provide trouble-free operation of the fuel dispensers it is necessary secure the stabilized fuel dispenser supply by the standby source - UPS. Power supply dropouts, heavy disturbances or drop of voltage in peak hours (particularly during winter season) are very frequent phenomena in our power supply network. All phenomena as above can be eliminated by utilization of a correct standby source (UPS). There are two models of standby source available and suitable for the fuel dispensery in our market: UPS of line interactive type, UPS of on-line type.
UPS of the line-interactive type is enough for stabilization in the filling stations connected to a very stable power supply network (without any voltage drop and without any disturbances).In other cases the ON-LINE type UPS has to be applied. Disturbances, drops of voltage or failures can result in frequent blocking of the dispensers, problems with computer/dispenser communication, failures of computers (data loss), etc.

IMPORTANT NOTICE

For trouble-free operation of the fuel dispensers the signal cables **have to be** separated thoroughly from the power supply cables. Parallel laying of power and signal cables without any separation results in disturbances and undesirable parasite phenomena which may cause problems with fuel dispenser control and/or even full damage of electronic units inside the dispensers and in the kiosk. Therefore any crossing or parallel laying (in a single bundle) of the signal and power cables has to be prevented reliably. Separate "channels" (metal tubes, troughs) for power and signal cables represent a suitable solution. **The manufacturer is not liable for the damages caused due to unsuitably designed cable laying and wiring!!!**

3. Basic Functions and Dispenser Setting

Setting of the fuel dispensers is done by the set of parameters, by which functional dispenser parameters can be controlled, mode and behaviour of the dispenser in different situations changed materially. Values of the parameters can be monitored and changed either by the remote IR controller or by the functional keys placed directly on the calculator or on a simple keyboard, being the integral part of the calculator assembly.

Method of setting of the fuel dispenser differs, depending on the type of the used calculator placed in the dispenser head. The section below describes basic functions and setting for the calculators PDE, Puma HT-TE, Puma MPD, ADP and ADPMPD.

3.1. PDE Calculator

The calculator PDE, manufactured by the company TATSUNO-BENČ EUROPE a.s., is set by the remote IR controller (marked PDERT). The setting mode serves for monitoring and change of the parameters and provides the following operations:

- displaying of non-resetable electronic volume and cash amount totalizers of all hoses
- displaying and reset of daily electronic volume and cash amount totalizers of all hoses
- setting of unit product prices (manual mode)
- setting of different functional parameters of the dispenser

The setting mode can be recalled on the dispenser by the method below only if the dispenser is at rest (completed dispensing, all nozzles are accommodated in the boots). There are two setting modes available:

- ***Operator mode*** (specified for filling station operators) – the operator can only read values of electronic totalizers and values of basic dispenser parameters. The operator can neither reset nor change their values.
- ***Manager mode*** (specified for the filling station manager) – The manager is authorized both to read the values, reset daily totalizers and to set basic operating parameters of the fuel dispenser. The manager must load the access password to be able to work in the manager mode.

Fig. 6 - Remote IR controller PDERT-3O

3.1.1. Remote Fuel Dispenser Control

A special remote IR controller must be used for reading dispenser values (totalizers), change of the dispenser mode or for setting different calculator parameters on the fuel dispensers equipped by the **PDE calculator**. The Remote controller keyboard had the following keys and their layout:

key	function	key	function
OPERATING STATE		***CALCULATOR PARAMETER READING***	
<Shift>< Enter>	Release of dispenser side after payment or failure	**<Next>**	Switching to next parameter
< 0 >	Release of both sides (whole fuel dispenser) after payment or failure	**<Shift> <Next>**	Switching to previous parameter
< 1 >	Preset - depressing of corresponding preset key No. 3 (10 litres)	**< + >**	Switching to next parameter item
< 2 >	Preset - depressing of corresponding preset key No. 4 (1 litre)	**<Shift> < + >**	Switching to previous parameter item
< 3 >	Displaying of the latest refilling on the display	**< Enter >**	Changed value of the displayed parameter (if the operation is permitted)
< 4 >	Preset - depressing of corresponding preset key No.1 (CZK 100)	**<0>** až **<9>**	Direct switching to the parameter with preset number
< 5 >	Preset - depressing of corresponding preset key No.2 (CZK 10)	**<REG>**	End of selected mode
< 6 >	Cancel of preset on one fuel dispenser side (preset key No.5 – Cancel)	***CHANGE OF PARAMETER VALUE AND LOADING OF ACCESS***	
< 7 >	Lighting fuel dispenser ON	**<0>** až **<9>**	Loading of value of the edited digit and switching to the next figure
< 8 >	Displaying of converted CNG gas volume (if the function is activated))	**< + >**	Increase of value of just edited parameter digit
< 9 >	Lighting fuel dispenser OFF	**<Shift> < + >**	Decrease of value of just edited parameter digit
		<Next>	Switching to editing of the next parameter digit
START OF SETTING MODES		**<Shift> <Next>**	Switching to editing of the previous parameter digit
<Shift> <REG>	Commences the operator mode	**< Enter >**	End of change and loading of a new value
<REG>	Commences the manager mode (upon loading the password)	**<Shift>< Enter>**	End of change w/o loading of a new value

Table 9 - Description of the keys on the remote PDE calculator controller

When reading electronic totalizers of the fuel dispenser, the following rule for hose numbering is valid:

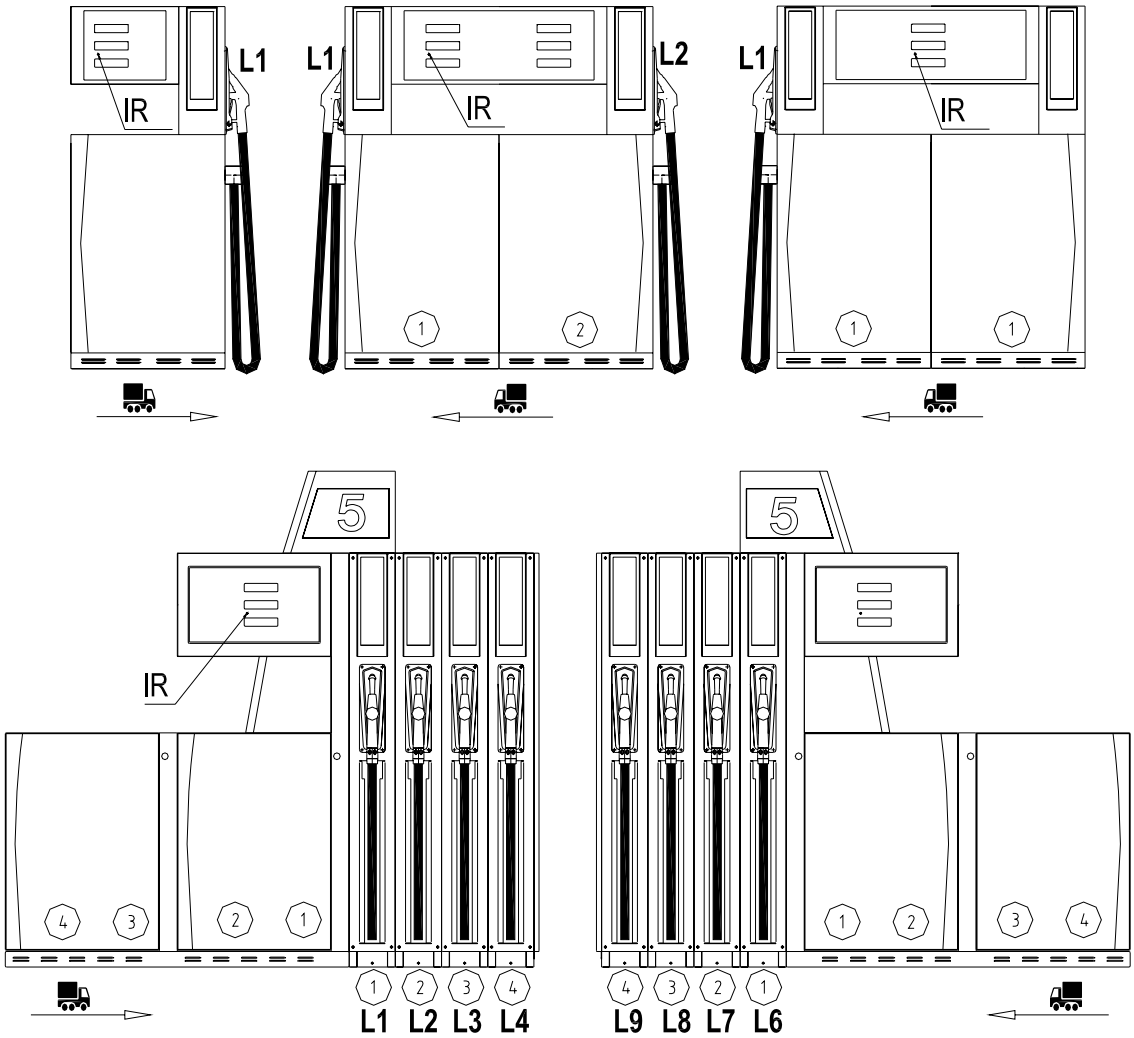


Fig. 7 - Numbering of hoses and products

Pos.	Description	Pos.	Description
⇦	Recommended car arrival direction	①② ③④	Numbers of fuel products (for setting price)
IR	Placing of IR sensor for the remote controller PDERT	**L1,L2** **L3,L4**	Numbers of dispensing hoses for side A (for reading of litre electronic totalizers)
		L6,L7 **L8,L9**	Numbers of dispensing hoses for side B (for reading of litre electronic totalizers)

3.1.2. Setting of Parameters on Dispenser with Fuel Volume Display

The process of setting is similar to that of the classic three-line display, only functions of certain keys on the remote controller keyboard differ.

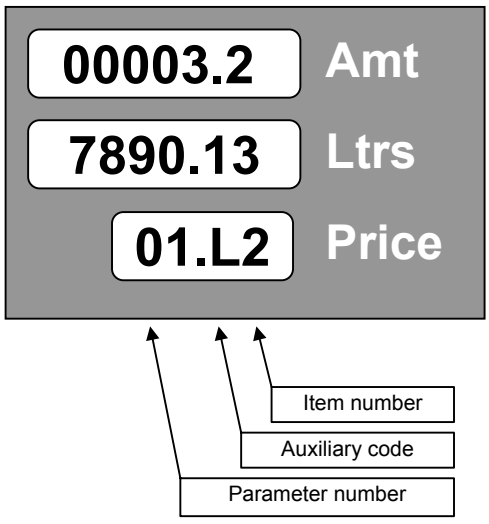
Basic principles of setting in the manager and service mode:

1. The manager mode is entered by depressing the key <**REG**>. The word „CODE“ appears for ca 1 second on the display. Now the password must be loaded. After loading the correct password and confirmation by the key <**Enter**> the volume display will shown „-0“ and the dispenser waits for loading the relevant parameter digit.
2. Switching between the parameters - by the keys <**Next**> and <**Shift**><**Next**>, between sub-parameters - by <+> and <**Next**> <+>
3. To display value of the parameter on the line “Litres” (fuel volume) - depress the key <**1**>. To display value of the parameter on the line „Price“ (cash amount) - depress the key <**2**>. The key <**Shift**> <**Enter**> again displays the number of the parameter (i.e. displays the line „Kč/litr“ - unit grade price)
4. Change (editing) of parameter value - by the key <**Enter**>
5. Mode exit - by the key <**REG**>

Viewing of the parameters (totalizers) in the operator mode is done in the same way. When depressing the key <**Shift**> <**REG**>, the first parameter 01 will appear automatically. Switching between the parameters - by the keys <**Next**> and <**Shift**> <**Next**>, between sub-parameters - by <+> and <**Shift**> <+>. By depressing the keys <**1**> and <**2**>, parameter values can be monitored. Operator mode exit - by depressing the key <**REG**>.

3.1.3. Data Monitoring in Setting Mode

All data in the setting modes are displayed on the dispenser display. When controlling by the remote controller, the data are displayed on the dispenser side, which the setting mode was recalled from (by the controller). Individual parameters are displayed as follows:



Parameter number : 01
Item number: 2
Auxiliary code: L
Parameter value: 327890,13

Fig. 8 - Example of parameter displaying

3.1.4. Operator Mode

The operator mode is started by pointing the dispenser display by the IR remote controller (at the distance of ca 1 m from the dispenser) and by depressing the key <**Shift**> and then the key <**REG**>. ***All nozzles must be locked securely in the boot !!***

After the operator mode is recalled, value of the first parameter is displayed. Switching to the next parameters and their items is carried out using the keys <**Next**> and <**+**> (see sec. 3.1.1.).

The operator mode enables to display (***but not change*** !!) the following parameters:

Param.	Description
01	Non-resetable totalizers
02	Daily totalizers
03	Unit fuel product prices
04	Current time and date
05	Version of program and CRC parameters (check total)
06	History of failures
07	History of dispensing

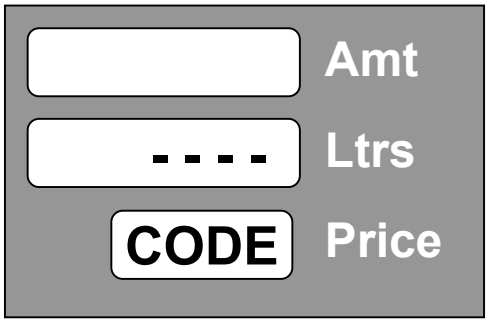
Table 10 - List of operator mode parameters

The operator mode is ended by depressing the key **<REG>** on the remote controller. The mode is also ended automatically, if no key is depressed for 60 seconds.

3.1.5. Manager Mode

The manager mode is started by pointing the dispenser display by the remote controller (at the distance of ca 1 m from the dispenser) and by depressing the key <**REG**>. ***All nozzles must be locked securely in the boot*** **!**

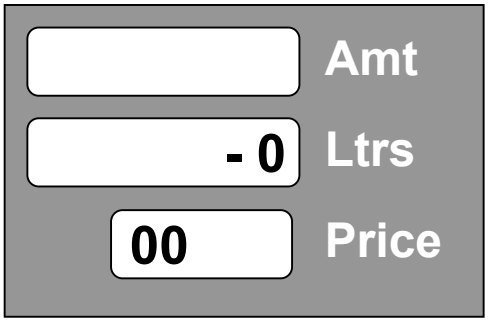
After the manager mode is recalled, the display shows the prompt for loading the 4-digit access password:



To have the password secret, the loaded digits are displayed as points. The manufacturer has set the access password : „1111".

Example:

Depress the keys <**1**><**1**><**1**><**1**> and <**Enter**>



After the valid password is loaded, the display shows the parameter number 00; by depressing the key <**Enter**> you can continue by automatic switching to the parameter No. 01, or it is possible to load the **parameter number** and <**Enter**> for direct switching to the requested parameter. After the manager mode is recalled, value of the first parameter will be displayed.

The manager mode enables to display and change (set) the following parameters:

Param.	Description
01*	Non-resetable totalizers
02	Daily totalizers
03	Unit prices of the products
04	Current time and date
05*	Version of program and CRC number
06*	History of failures
07*	History of dispensing
08	Access password
09	History of maintenance
10	- unused -
11	- unused -
12	Fuel dispenser operating mode
13*	Statistics of failures
14*	Current operating temperature
15	Reset of daily totalizers
16	Operating check number
17	- unused -
18	Text messages of LCD alphanumeric display
19	Displaying of display segment error
Parameters marked by asterisk (*) can be viewed only in the manager mode, not set	

Table 11 - List of manager mode parameters

The manager mode is ended by depressing the key **<REG>** on the remote controller. The mode is also ended automatically, if no key is depressed for 60 seconds.

3.1.5.1. Non-resetable totalizers (code 01)

Electronic totalizers of all hoses (meters) are stored in electronic calculator memory. These totalizers are ***non-resetable*** and show how many litres were dispensed by individual hoses.

item number	description
1	volume dispensed by the hose 1 in litres
2	volume dispensed by the hose 2 in litres
…	…
9	volume dispensed by the hose 9 in litres
H	volume dispensed by the hose 10 in litres

Table 12 - Non-resetable totalizers (code 01)

3.1.5.2. Daily totalizers (code 02)

The electronic daily totalizers of all hoses (meters) are stored in electronic calculator memory. ***These totalizers can be reset at any time (manager mode - parameter 15).*** The daily totalizers show, what fuel volume /cash was dispensed by individual hoses since the latest resetting.

aux. code	item number	description
L	1	volume dispensed by the hose No.1 in litres
A	1	amount dispensed by the hose No.1 in currency
L	2	volume dispensed by the hose No.2 in litres
…	…	…
A	9	amount dispensed by the hose No. 9 in currency
L	H	volume dispensed by the hose No.10 in litres
A	H	amount dispensed by the hose No.10 in currency

Table 13 - Daily totalizers (code 02)

3.1.5.3. Fuel Product Unit Prices (code 03)

The function enables to display and set current unit prices of all fuel products (i.e. prices per 1 litre of fuel) sold for cash.

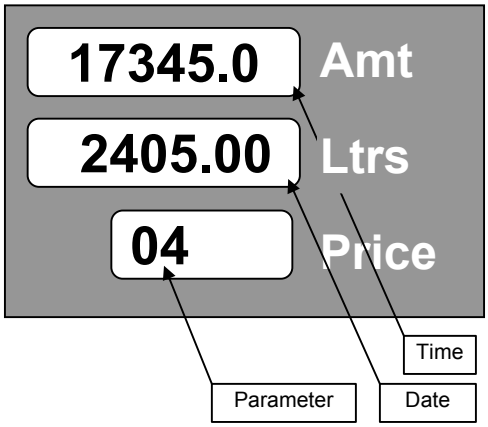
item number	description	default setting
1	unit price of product 1	00.00
2	unit price of product 2	00.00
3	unit price of product 3	00.00
4	unit price of product 4	00.00
5	unit price of product 5	00.00

Table 14 - Unit prices of individual fuel products (code 03)

If the fuel dispenser (calculator) is connected to the control system, then the price is updated after each calculator activation, namely by the product values set in the control system

3.1.5.4. Current Time and Date (code 04)

The function enables to display and set the current date and time. Setting can be done by depressing the key <**Enter**> and by loading date and time.



The first line displays time in the format HHMMSS (hours, minutes and seconds), the second line displays date in the format DDMMYY (day, month and year) - example 17:34:50 24.05.00

3.1.5.5. Displaying of Program Version and Check Sum (code 05)

The function displays the number of the program version of the dispenser calculator and the check sum of memory parameters.

- Line 1 (amount) – check sum
- Line 2 (litres) - version number (e.g. 3.34 - version 3.34)

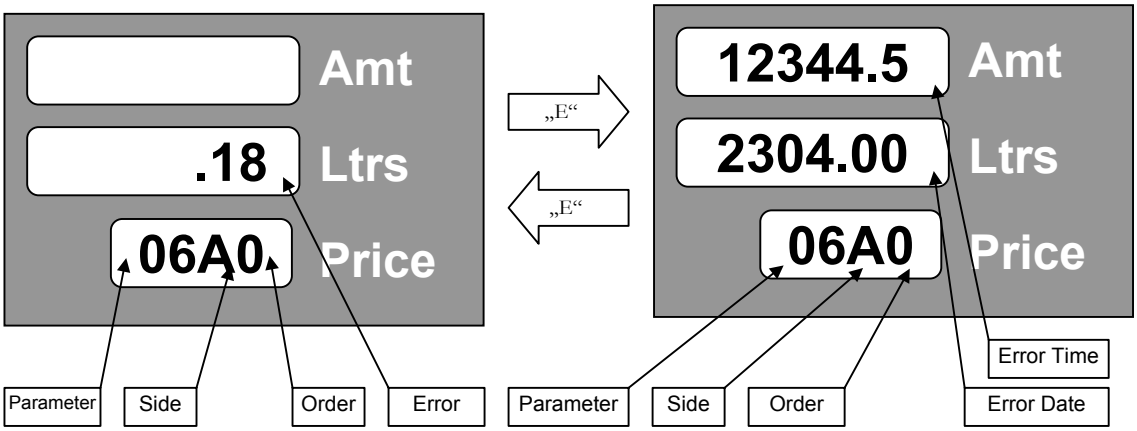
3.1.5.6. Displaying of Latest Error Conditions of Fuel Dispenser (code 06)

The function serves for displaying of the history of the latest ten error codes of faults, occurred on the dispenser.

Table of error messages can be found in the Appendix D.

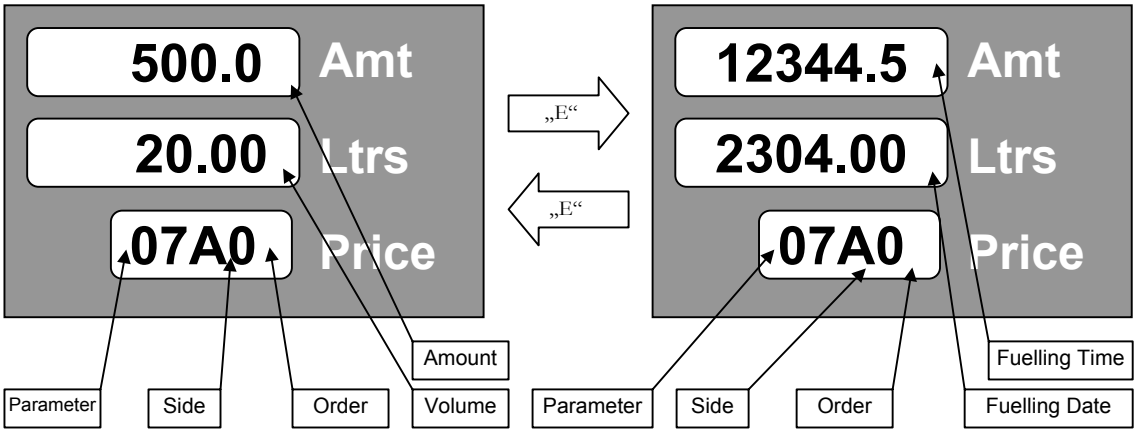
aux. code	item number	description
A	0	code of the last (tenth) error of the dispenser on display side A
B	0	code of the last (tenth) error of the dispenser on display side B
A	1	code of the last but one (ninth) error of the dispenser on side A
B	1	code of the last but one (ninth) error of the dispenser on side B
…	…	…
A	9	code of the error (first in the history) of the dispenser on side A
B	9	code of the error (first in the history) of the dispenser on side B

Table 15 - Displaying of error conditions of the fuel dispenser (code 06)



3.1.5.7. Displaying of History of Dispensing (code 07)

The function serves for displaying of the history of the latest 10 dispensing transactions (on each side) realized on the dispenser. Data layout of this parameter on the display is as follows:



aux. code	item number	description
A	0	last transaction (tenth) on side A
B	0	last transaction (tenth) on side B
A	1	last but one transaction (ninth) on side A
B	1	last but one transaction (ninth) on side A
…	…	…
A	9	transaction (first in the sequence) on side A
B	9	transaction (first in the sequence) on side B

Table 16 - Displaying of the history of dispensing (code 07)

The first and second line contain price (cash amount) and dispensed volume. The unit price of the transaction with the parameter number and the auxiliary code with the item number take turns on the third line. Number of the item means position in the history of transactions - 0 is the last (newest) transaction, 9 is the oldest stored transaction. The auxiliary code means the dispenser side A or B. If the memory stack for the history of transactions is empty (i.e. there is no transaction in the history), "error" appears on the display.

3.1.5.8. Access Password (code 08)

The function enables to display and change the access password into the manager mode.

Default setting is „1111".

3.1.5.9. History of Maintenance (code 09)

The function enables to display codes of the last 10 service remote controllers which the calculator parameters were set by.

3.1.5.10. Operating Fuel Dispenser Mode (code 12)

The function defines the type of operating fuel dispenser mode.

parameter value	Operating fuel dispenser mode
0	Automatic mode
1	Manual with switching to the automatic mode (default)
2	Manual with switching to the automatic mode and locking
3	Manual (stand alone) mode
4	Credit (internal credit - "Chipper")

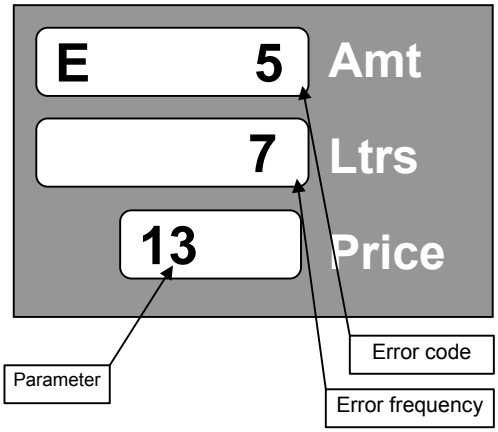
Table 17 - Operating fuel dispenser mode (code 12)

The parameter may obtain the values in the range from 0 to 4 (**the value 4 may be set for the credit version PDE only!)**

- If value of the parameter equals to **0**, the fuel dispenser is operated in the pure automatic mode i.e. it is connected to the master computer (console). The fuel dispenser is controlled by the computer fully (fuel dispenser release, locking, setting of fuel prices, etc.). Interrupted communication between the computer and the fuel dispenser is subject to the error message E 18 which appears on the display.
- If value of the parameter equals to 1, the fuel dispenser is operated in the manual mode (see the mode No. 3) until it is connected to the master computer. Then the computer is switched automatically to the automatic mode (see the mode No.1). Interrupted communication between the computer and the fuel dispenser is subject to the error message E 18 which appears on the display.
- If value of the parameter equals to **2**, the fuel dispenser is operated in the manual mode (see the mode No. 3) until it is connected to the master computer. Then the computer is switched automatically to the automatic mode (see the mode No.1). Unlike the mode 2, the fuel dispenser is locked after each transaction and has to be unlocked by the magnets or by the remote controller by depressing the key <**0**>. Interrupted communication between the computer and the fuel dispenser is subject to the error message E 18 which appears on the display.
- If value of the parameter equals to **3**, the fuel dispenser is operated in the pure manual mode. The fuel dispenser is independent fully (cannot be connected to the computer). Unit fuel prices may be set by the fuel dispenser parameter No. 3.
- If value of the parameter equals to **4**, the fuel dispenser is operated in the credit mode. The fuel dispenser may be switched to this mode only if the fuel dispenser is equipped by the credit module PDECRE and the switch cash/Credit is in the position "ON".

3.1.5.11. Error Statistics (code 13)

The function serves for displaying statistics of the errors which took place on the fuel dispenser since the moment of initialization or resetting of the electronic calculator. This parameter has differing data arrangement on the display:



The first and second line contain the fault code and the frequency rate of the fault in question.

3.1.5.12. Current Operating Temperature (code 14)

The function displays the current temperature measured by the temperature sensor placed on the processor board.

- line 1 (Amount) – operating calculator temperature
- line 2 (Litres) - temperature of the product 1, 2, 3 or 4 (only if the temperature sensors are installed)

3.1.5.13. Daily Totalizer Resetting (code 15)

The function serves for resetting of all daily totalizers (registers) of the dispensing hoses.
After setting the parameter value to **1** and after confirmation all totalizers will be **reset**.

3.1.5.14. Operating Check Number (code 16)

The function serves for displaying of the 6-digit operating check number and for operating code loading.

- 1 line 1 (Amount) – operating check number

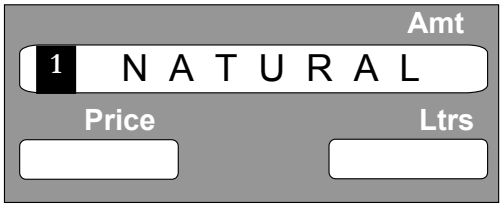
3.1.5.15. Text messages (code 18)

If the fuel dispenser is equipped by the alphanumeric display, the function enables to set the text messages which will appear on the alphanumeric display. The text messages may be divided into three groups:

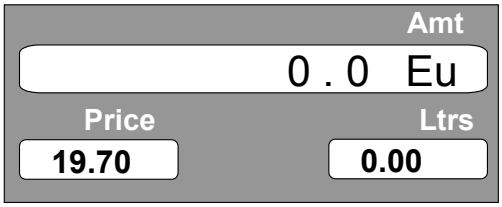
- product names
- state messages
- promotion messages

Text messages No...**1** to No...**5** are reserved for product names. The product name with the product number appear on the display immediately after nozzle release, prior to display resetting. 7 characters may be used for the product name. The first character is reserved for the dispensed product number. Product names may be set directly on the fuel dispenser and from the master computer (if enabled by the control system).

Nozzle release



Start of dispensing



- Text messages No.**9** and No.**109** are reserved for state messages. The said messages relate to the fuel dispenser state. The message No.**9** (if permitted) will appear on the display immediately after completed refueling (after putting the nozzle back - before display resetting). The said message will take turns on the display with the transaction data (e.g. "Payment" – 100.00 – „Payment“ – 100.00 ……). The message No.**10** (if permitted) will appear on the display always after the fuel dispenser is locked. The said message will take turns on the display with the transaction data (e.g.. „Locked“ – 100.00 – „Locked“ – 100.00 ……)

- The text messages No. **11** to **23** are devoted to the promotion messages. The messages No.**11 to 19** (if permitted) will appear on the display always after its resetting. The said messages will take turns on the display. The text message No. **20** (if permitted) - current time. Time will appear on the display always after fuel dispenser display resetting. The current time has to be set after the fuel dispenser is switched off and on (the current time setting is reset after the fuel dispenser is switched off). The text message No. **21** (if permitted) - current date. It will appear on the display always after fuel dispenser display resetting. The text messages No. **22** and **23** (if permitted) display the currency and quantity unit in case of data preset on the fuel dispenser.

parameter value	auxiliary code	description
0	-	Not display the text message
1	1,2 až 20	Display text message
2	1,2 až 20	Text message editing

Table 18 - Setting of text message displaying (code 18)

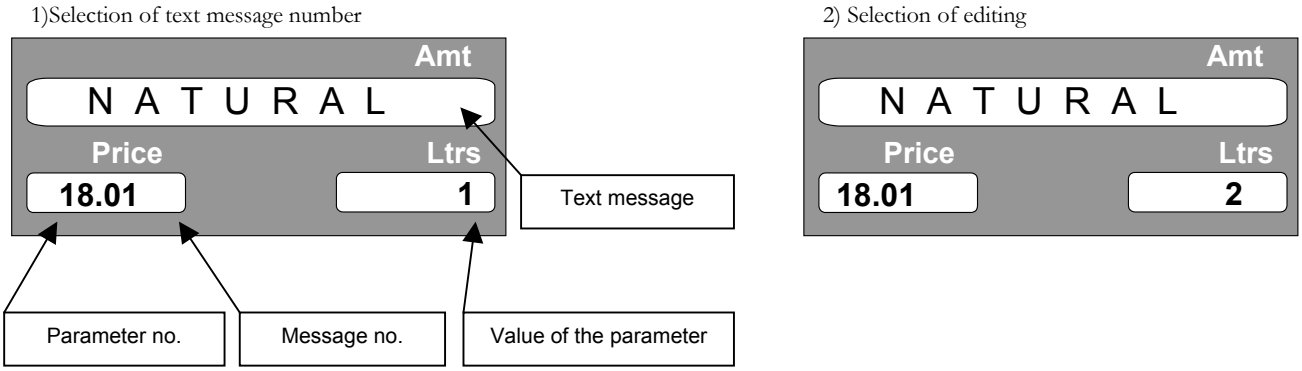
The parameter may obtain the values from 0 to 2. The manufacturer's setting can be seen in the table 19. Value of the parameter for all text messages equals to 0 for the displays other than the alphanumeric display.

Message number	Message content	Message length (char.)	Character set			Default setting 0 - OFF 1 - ON
			Latin2 (Win 1251)	ASCII	Cyrilic (Win 1251)	
1	Product name No. 1	7	Natural	BenzBLF	АИ-95	1
2	Product name No. 2	7	Special	Benzin	А-76	1
3	Product name No. 3	7	Super	Super	АИ-96	1
4	Product name No. 4	7	Nafta	Diesel	Дизел	1
5	Product name No. 5	7	Bio	Bio	АИ-90	1
6	Reserved					
7	Reserved					
8	Reserved					
9	Text after completed dispensing	8	Zaplatit	Payment	Спасибо	0
10	Text after locking	8	Blokován	Locked	Блокир.	0
11	Text after display resetting	8	Vítáme	Welcome	Привет	0
12	Text after display resetting	8	Vás			0
13	Text after display resetting	8	na naší			0
14	Text after display resetting	8	stanici.			0
15	Text after display resetting	8				0
16	Text after display resetting	8				0
17	Text after display resetting	8				0
18	Text after display resetting	8				0
19	Text after display resetting	8				0
20	Text after resetting - time	8	00:00,00	00:00,00	00:00,00	0
21	Text after resetting - date	8	01/01/90	01/01/90	01/01/90	0
22	Text of preset for cash amount	2	Kč	$	Ру	1
23	Text of preset for fuel volume	2	Lt	Lt	Лт	1

Table 19 - Table of plant setting of the text messages

Sequence of text message editing is as follows:

1) Select the parameter No.18 and then select the text message number (using the keys <+> and <**Shift**> <+>)
2) Depress enter (key <**Enter**>) and load value of parameter 2 - editing.
3) Move the cursor to the first alphanumeric character which may be edited. Now load - scrolling the characters forwards or backwards - using the keys <+> and <**Shift**><+>. When the selected character is displayed, depress the key < **Next** > to move to the next character.
4) After setting of the message is completed, depress <**Enter**>



3.1.5.16. Displaying of Display Segment Error (code 19)

The function enables/disables displaying of the display segment error (El) by the processor.

Parameter value	Description
0	Do not display the error of the display segment
1	Display the error of the display segment - ***default setting***

Table 20 - Displaying of the display segment fault/error (code 19)

3.2. Calculators Puma HT-TE and Puma MPD

The calculators Puma HT-TE and Puma MPD produced by the company Gilbarco Veederoot S.p.A. (the former company Logitron) are set by the three-key keyboard.

Fig, 9 - Keyboard of the calculators Puma HT-TE and Puma MPD

Functions of the keys are as follows:

Key	Function
<->	Entry into the price setting mode (after calculator switching) Selection of figures on the unit price display
<+>	Value increase

Price setting (for manual mode)

Unit price setting is done in the manual mode namely as follows:

- switching the calculator OFF and ON
- display mask removal
- depressing the key <-> (the calculator is switched to the price setting mode)
- selection of the figure for the price, the value of which is to be changed by the key <->
- setting of the value of the selected figure by the key <+>
- display mask mounting
- switching the calculator OFF

Setting or monitoring of parameters

This operation is reserved to service technicians (servicemen) only !!!

3.3. Calculators ADP and ADPMPD

The calculators ADP and ADPMPD produced by the company Beta Control s.r.o. are set, using the IR manager keyboard KL-MANINF provided with four keys <R>, <0>, <+> and <->.

Functions of the keys are as follows:

Key	Function
<0>	Entry into the price setting mode (after calculator switching)
<->	Selection of figures on the unit price display. Selection of the product (grade) for pricing
<+>	Value increase. Entry into the mode of totalizer reading (fuel dispenser at rest)

Price setting (for manual mode)

Unit price setting is done in the manual mode only, namely as follows:

- switching the calculator ON/OFF
- directing the fuel dispenser display by the IR keyboard and depressing the key <0>
- selection of the figure for the price, the value of which is to be changed by the key <->
- setting of the value of the selected figure by the key <+>
- switching to another product /grade (dispensing hose) by the key <->
- end of setting by depressing the key <0>

Displaying of electronic totalizers

Displaying of the electronic totalizer is carried out as follows:

- the fuel dispenser is at rest, all transactions are transferred to the POS and all nozzles are suspended in the boot
- by directing the IR keyboard onto the fuel dispenser display and by depressing the key <+> , the volume (litre) totalizer of the first nozzle will appear - e.g. "U0000012345.90"
- by depressing the key <+>, the sum totalizer of the first nozzle will appear - e.g. "A00000235678.9"
- by depressing the key <+>, volume and price totalizers for other nozzles will appear
- totalizer reading is ended by depressing the key <0>

Setting or monitoring of parameters

This operation is reserved to service technicians (servicemen) only !!!

4. Operation

4.1. Instructions for Safe Operation

The fuel dispenser is a complex device which must fulfill a number of demanding functions. It is therefore necessary to clean the tanks, pipe distributions and carry out check for fuel purity prior to putting the dispenser into operation. Prior to activating, inspection of el. power distribution and check for correct wiring have to be carried out to prevent electric shock and to provide flameproofness.

Fig. 10 - No smoking

Fig. 11 - No open fire

Fig. 12 - No mobile phones

CAUTION

- **Smoking and open fire handling is prohibited in the vicinity of the dispenser.**
- **Smoking is prohibited also for the persons sitting in the car.**
- **It is prohibited to use the mobile phone in the vicinity of the dispenser.**

It is prohibited to dispense if the motor is running.

Fig. 13 - Information label layout

Fig. 14 - Information label - Liquid fuels

WARNING

Fuel dispensers are harmless for the operator and user from the hygienic point of view. It is nevertheless advisable to protect the hands by gloves (e.g. made of eco-sheet), when dispensing and carrying out minor maintenance. Polluted skin shall be washed by water and soap as soon as possible. Call the doctor if eyes are affected. When dispensing, do not breath petrol vapours.

4.2. Putting Fuel Dispenser into Operation

Switching the fuel dispenser ON/OFF is carried out in the master switchboard of the filling station, where fuel dispenser feeders are connected. Each fuel dispenser has three power supply outlets in the master switchboard:

- feeding of pump and vacuum pump el. motors (3x400 V)
- feeding of electronic fuel dispenser calculator (230V stabilized)
- feeding of valves, pump and vacuum pump el. motor switching (230V non-stabilized)

All points above are protected by relevant circuit breakers, by which the fuel dispensers are switched ON/OFF.

RECOMMENDATION

Switching the fuel dispenser ON shall be done as follows:

1) **Switching ON the standby source (UPS) in the kiosk (the green pilot lamp of the UPS goes on)**
2) **Switching ON the 230 V circuit breaker for stabilized feeding of the electronic fuel dispenser calculator (all display segments are tested automatically and values of the last operation of dispensing will be displayed)**
3) **Switching ON the 230 V circuit breaker for non-stabilized feeding of valves, pump and vacuum pump el. motors**
4) **Switching ON the 3x400V circuit breaker for feeding pump and vacuum pump motors**

Now the fuel dispenser is ready for dispensing/refueling.

4.3. Fuel Dispenser Operation

ATTENTION

Operator is liable for normal running of the filling station; the operator shall monitor fuel dispensing and if the customer proceeds in the non-permitted way, the operator must instruct the customer how to handle the dispenser correctly. The operator shall also mark the risk zone of the filling station by emergency symbols (no smoking, no open fire, driveway direction, etc.). The operating instructions of the filling station and/or the information about basic obligations must be available for the customer.

The fuel dispenser is activated by taking the nozzle out of the boot, which operation resets el. calculator data automatically. Pump el. motor will be started and dispensing can be commenced. Fuel flow rate is controlled by the nozzle. Dispensing is terminated by nozzle locking (release of the control lever). The nozzle is then pushed into the nozzle boot which leads to switching OFF the pump el. motor. The data concerning the dispensed volume remains preserved until the next nozzle release or until the relevant cash amount is settled.

4.3.1. Dispensing

The liquid measured by the meter is led through the sight glass into the hose and nozzle screwed to the hose. For self-service operation of the filling stations the stop-nozzles with the safety lock are used:

The flow rate can be controlled by the control lever. In the basic version the nozzle is supplied with lever arrest. At the customer's wish the nozzle is supplied without the arrest, i.e. the lever must be depressed for the whole operation of dispensing. Lever release or falling the stop-nozzle out of the tank hole results in stopped fuel flow.

The stop-function is activated in case of the fully filled tank (sensor orifice flooding), the fuel flow is stopped even at the fully depressed control lever. The safety function is activated in case of unprofessional nozzle handling, e.g. if the nozzle is lifted by more than 15 degrees from the horizontal plane the fuel flow will be stopped (even if the control lever is depressed). After activated stop-function and safety function the control lever must be released - the level returns to the initial position.

Nozzle positions when dispensing

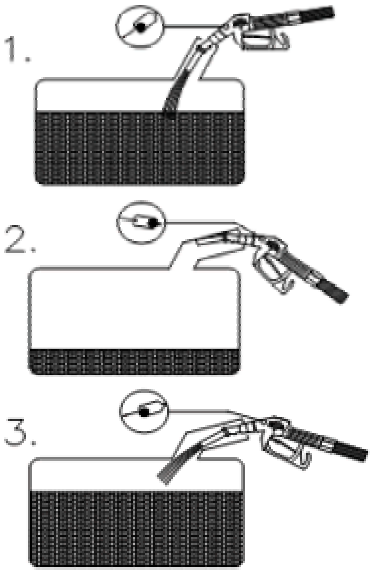


Fig. 15 - Nozzle positions when dispensing

Correct nozzle position, when dispensing
The nozzle is in nearly vertical position; the ball does not prevent air passage and the fuel flows freely.

Incorrect nozzle position
The nozzle is deflected from the horizontal position, the ball prevents air passage and fuel does not flow out.

In case of different versions of fuel tank sockets it is necessary to find the optimum nozzle position. Fuel flow can also be stopped, if the fuel from the nozzle bumps the tank socket wall. In this case the optimum nozzle position must also be found.

4.3.2. Electromechanical Litre Totalizers

The fuel dispensers TATSUNO-BENČ are equipped by electromechanical totalizers (as the standard) for monitoring of the total fuel volume dispensed by each hose. The totalizers are placed on the fuel dispenser display. One 7-digit totalizer, showing the number of full litres pumped by the relevant hose, corresponds to each dispensing hose. In case of MPD fuel dispensers the electromechanical totalizers are arranged on the display from above down and are designated by the dispensing hose numbers.

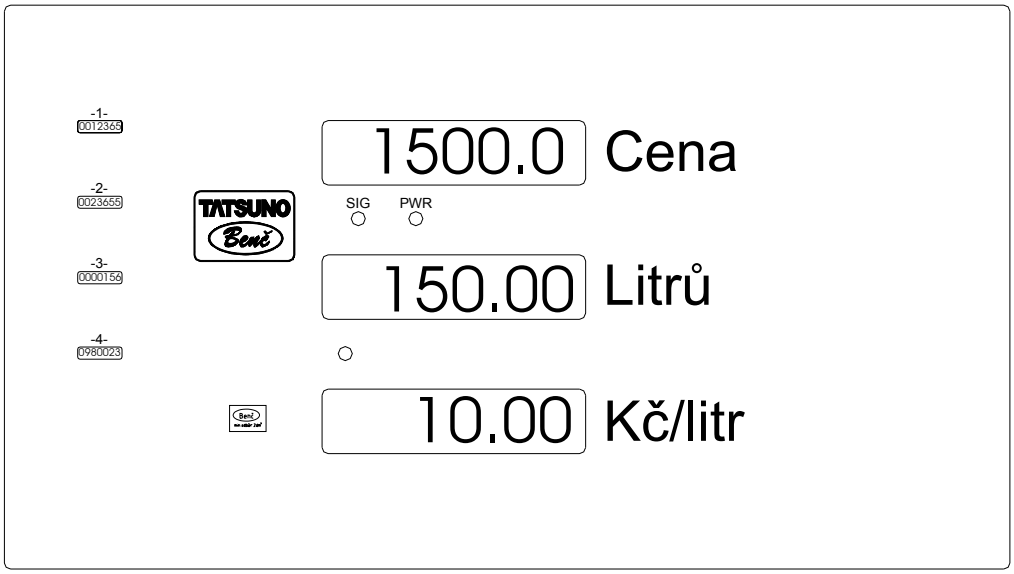


Fig. 16 – Layout of electromechanical totalizers and signaling diodes SIG and PWR on the display

NOTE

The electromechanical totalizers are also marked by figures 1, 2, 3, 4 on the display B. Totalizer numbers correspond to the dispensing hoses 6, 7, 8 and 9.

4.3.3. Fuel Dispenser Display Back-lighting

Displays of all fuel dispensers are back-lighted by SMD LED diodes. In case of the PDE calculator intensity of back-lighting is controlled as follows: the maximum intensity during dispensing and reduced to one third if the data on the display are not changed (automatic switching after expiration of 30 seconds).

4.3.4. Signaling Diode SIG on the Display

The signaling diode marked SIG has the following two functions:

- Signaling of vapour recovery (green)
- Signaling of the state of payment, blocking and fault of the fuel dispenser (red)

The signaling diode **SIG** gives **continuous green light** if function of the system of petrol vapour recovery is OK. The signaling diode **SIG** is switched to **continuous red light**, if the fuel dispenser waits for paying or is in the blocked state and is switched to the **blinking red light** if the fuel dispenser is faulty.

4.3.5. Signaling Diode PWR on the Display

The orange signaling diode **PWR** serves for signaling of dispenser calculator feeding. If the diode is ON, the dispenser calculator is actuated.

4.3.6. Vapour Recovery

At the customer wish the fuel dispensers TATSUNO BENČ are equipped by the system of petrol vapour recovery, where fuel product vapours (except the diesel oil) are exhausted from the point of nozzle outlet via the exhauster into the fuel tank.

In case of vapour recovery of the single-product fuel dispenser the exhauster is driven directly by the fuel dispenser pump el. motor.

Vapour recovery of multi-product dispensers: each fuel dispenser side has its own exhauster and exhausted vapour flow is controlled by the fuel flow, i.e. exhausting is switched off if no fuel is dispensed into the tank.

Activated exhausting is signaled by the control LED diode **SIG** placed on the **display panel** (separate for each fuel dispenser side). If vapor exhaustion is set correctly, the signaling LED diode goes **green** whenever the fuel starts to flow out, i.e. the vapours pass through the exhausting piping (the vapour flow meter placed downstream the vacuum pump is active)

Fig. 17 - Connection of the vapour flow sensor

Activated vapour exhausting is controlled by the vapour flow meter placed on the exhausting piping downstream the vacuum pump. When checking this assembly, the fuel dispenser door has to be removed (Fig. 20).

Conditions of filling station operation (Regulation 355/2002 Coll. - Appendix 12)

All fuel dispensers serving for petrol dispensing must be provided by a clear sign notifying the customers of the necessity of full nozzle insertion into the filling socket of the vehicle tank..

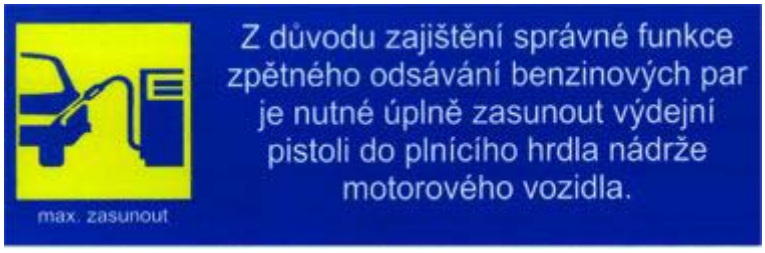

Z důvodu zajištění správné funkce zpětného odsávání benzinových par je nutné úplně zasunout výdejní pistoli do plnícího hrdla nádrže motorového vozidla.
max. zasunout

Fig. 18 - Exhaustion - Instructions for customers

Conditions of filling station operation (Regulation 355/2002 Coll. - Appendix 12)

Check of normal operation of the system for vapour recovery of the fuel dispensers shall be done by the filling station operator regularly, once a shift as a minimum. In case of the dispensers equipped by the optic signaling of exhauster operability the operator shall check the pilot lamp during refueling.

ATTENTION

If the operator has the reason to believe that the recovery or signaling system is out of order, he shall notify the service operation immediately; the latter shall carry out inspection, check and repair of the defect.

4.3.7. Fuel Dispenser Operation Modes

There are two basic fuel dispenser operation modes available :
1) manual mode
2) automatic (remote) mode

MANUAL MODE

Manual mode - the fuel dispenser is operated independently (standalone) without any remote control.

The customer comes to the fuel dispenser and releases nozzle of the product to be dispensed. The displays are reset and the pump motor is switched nearly immediately (within 1 second); the fuel dispenser is ready for dispensing. When dispensed, the customer pushes the nozzle into the boot and pays for the fuel. The dispenser is ready for the next operation of dispensing.

Because the dispenser is not controlled anyhow in the manual mode, the unit fuel price must be set manually on the dispenser.

The number of dispensed litres per shift is determined from the difference of electronic (and/or electromechanical) totalizers at the beginning and at the end of the shift

Automatic mode - the fuel dispenser is controlled remotely by the controller (program in PC, control console, etc.).

The automatic mode enables remote control of dispensing - from the filling station kiosk. The kiosk accommodates the control unit, from which the operator releases the dispenser for refueling and after dispensing collects the information about fuel volume and cash amount.

The customer comes to the dispenser and releases nozzle of the product to be dispensed. The fuel dispenser asks for permission from the control computer in the kiosk; the displays are reset (within 2 seconds after nozzle release) and the pump motor is started. When dispensed, the customer pushes the nozzle into the boot and goes to the kiosk to pay the relevant sum; he receives the tax document (receipt) for the dispensed fuel. The dispenser is ready immediately for the next operation of dispensing. Because the fuel dispenser is controlled remotely in the automatic mode, the unit fuel price need not be set manually on the dispenser. The correct unit price is set automatically on all fuel dispensers of the filling station by the control computer..

TRANSFER FROM AUTOMATIC TO MANUAL MODE

The fuel dispensers are connected and set (as a standard) as they should be operated in the filling station; i.e. if the filling station is equipped by the control system, the dispensers will be set to the automatic mode; if the station does not have any control system, the fuel dispensers will be set to the manual mode as a standard..

If the fuel dispensers have to be switched from the automatic to the manual mode - e.g. due to failure of the control system, it is necessary to proceed as follows:

a) *calculator PDE* - change of the value of the parameter P12 has to be done by the remote IR controller - from the value 1(2) to the value 3; check of unit price setting in the parameter P3 has to be done afterwards

b) *calculators Puma HT-TE and Puma MPD* - it is necessary to insert the shorting jumper into the communication junction box XT15 between terminals 0V and A/M, switch the fuel dispenser ON and OFF and check setting of the unit fuel price

c) *calculators ADP and ADPMPD* - change of the value of the parameter P51 has to be done by the IR keyboard - from the value 0 to the value 1; check of unit price setting has to be done afterwards.

ATTENTION

Transfer from the automatic to the manual mode shall always be consulted with the serviceman in advance!!!

4.3.8. Preset Keyboard

At the customer wish the fuel dispensers TATSUNO BENČ can be equipped by the preset keyboard, enabling fuel volume or cash amount presetting by the customer directly on the fuel dispenser. The customer can decide (prior to start dispensing) what fuel volume to be dispensed or for what cash amount.

The preset value can be cancelled by depressing the key <**Cancel**> prior to start dispensing. Then it is possible to select another value or to be dispensed normally (without any preset).

NOTE

If preset keyboards are to be used, then the fuel dispensers must be equipped by preset slowing valves.

Example of Presetting in CZK

1) The customer comes to the fuel dispenser and wishes to refuel himself for CZK 250.
2) The customer loads the value of 250 (depresses the key **<100 CZK>** twice and the key **<10 CZK>** five times) on the preset keyboard, using the numerical keys
3) The customer selects the hose (product to be dispensed) and releases the nozzle.
4) The fuel dispenser dispenses precisely the preset sum and stops automatically afterwards.
5) The customer pushes the nozzle back into the boot and pays the preset and dispensed cash amount.

Example of Presetting in Liters

1) The customer comes to the fuel dispenser and wishes to refuel himself by 20 liters of fuel.
2) The customer loads the value 20 (depresses the key **<10 litres>** twice**)** on the preset keyboard, using the numerical keys
3) The customer selects the hose (product to be dispensed) and releases the nozzle.
4) The fuel dispenser dispenses precisely the preset volume and stops automatically afterwards.
5) The customer pushes the nozzle back into the boot and pays the preset and dispensed fuel volume.

4.4. End of Fuel Dispenser Operation

RECOMMENDATION

Switching the fuel dispenser off should be carried out as follows:

1) Switch OFF 3x400V circuit breakers of pump and vacuum pump motor feeding
2) Switch OFF 230V circuit breakers for non-stabilized feeding of valves, pump and vacuum pump el. motors
3) Switch OFF 230V circuit breakers for stabilized feeding of electronic fuel dispenser calculator
4) Switch OFF the UPS source placed in the kiosk by the switch button on the real panel (the green pilot lamp on the UPS source goes off)

5. Maintenance and Service

CAUTION

Prior to start any maintenance intervention into mechanical, hydraulic or electric parts /assemblies, it is always necessary to disconnect the fuel dispenser from the power supply source and to protect it from re-connection reliably.

Fig. 19 – Fuel dispenser with removed guards

CAUTION

DO NOT REMOVE FUEL DISPENSER GUARDS ON THE RUNNING UNIT!!

CAUTION

**THE BELT BETWEEN THE MOTOR AND THE PUMP (AND/OR SUCTION PUMP) IS OF ANTISTATIC VERSION.
CANNOT BE REPLACED FOR ANOTHER TYPE MODEL!!**

Fig. 20 - Junction box cover

CAUTION

DO NOT OPEN THE JUNCTION BOX COVER IF THE FUEL DISPENSER IS ENERGIZED!

Survey of main principles of fuel dispenser maintenance:

- maintain all fuel dispenser assemblies clean so that possible unforeseeable fault can be identified easily and removed quickly
- check all joints systematically, in case of fuel leak re-tighten the joints and/or re-seal
- check and tighten the V-belt correctly (if necessary), using the swinging motor console
- check and tighten the screws which el. motor is fixed to the console by
- check condition of the nozzle and decide its repair or replacement, depending on the revealed defect
- check door locks and nozzle accommodation boot for correct functioning
- maintain the fuel dispenser clean, pay attention particularly to cleanliness of calculator glass
- remove sludge, water and other impurities out of the tanks (fuel reservoirs) regularly, using the sludge pump

Maintenance of fuel dispenser "body":

Parts of the fuel dispenser body made of reinforced plastic, lacquered steel or stainless steel need regular maintenance. A great attention shall be paid to these parts particularly in winter season, because aerosols of chloride preparations generated from the salts used for road maintenance can result in permanent damage of lacquers of untreated body parts and/or to intercrystalline corrosion in case of the guards made of stainless steel. Regular maintenance of fuel dispenser body is carried out by water and/or by solution of detergents and available car cosmetic preparations.

The service organization TATSUNO-BENČ SERVICE s.r.o. offers regular annual inspections of filling station technology.

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6. Solution of Problems

List of all error messages of electronic dispenser calculator can be found in the Appendix D..

Nozzle release leads to no reaction, no error message appears on the display
It means that the fuel dispenser is not connected to power supply source or nozzles are accommodated badly and/or the fuel dispenser is locked. • First of all try to unlock the dispenser by the remote controller (direct it on the display and depress "0"). • Then check dispenser feeding (when switched, the display is tested) and nozzle accommodation . • If everything is OK, try to switch the fuel dispenser calculator feeding OFF and ON. If the fuel dispenser is connected to the control computer (console), locking can be connected with the control system which fails to release the dispenser for normal operation. Disconnect the fuel dispenser from communication with the kiosk (or switch the control computer OFF) and then switch the fuel dispenser ON/OFF. If the dispenser runs in the manual mode, then the control computer is faulty
After nozzle release the display is reset, but the pump is not started
It means that dispenser el. motor was not started. Cause: switched off el. motor feeding circuit breaker, placed in the main switchboard or disconnected el. motor protection inside the fuel dispenser. Check fuel dispenser three-phase el. motor feeding.
Error message "E18" (PDE), "P20" (PUMA HT-TE, MPD), "F10" (ADP) appears on dispenser display
It is the error message of the fuel dispenser which notifies loss of communication between the fuel dispenser and the control computer (console). If the fuel dispenser is controlled by the computer, then check correct function of the computer program, connection of the communication line with the computer or data converter feeding (grey box which the communication line from the fuel dispenser enters into).
The customer releases the nozzle, but fails to start dispensing (e.g. due to car tank opening). The pump is switched off after some time
It is the error message of the fuel dispenser which notifies that dispensing was terminated due to break of dispensing for the time period over 60 seconds. Put the nozzle back and repeat dispensing
Operation of dispensing is interrupted (e.g. replacement of fuel cans), pump goes off after some time
It is the error message of the fuel dispenser which notifies that dispensing was terminated due to break of dispensing for the time period over 60 seconds. Put the nozzle back and repeat dispensing.
After nozzle release the error message "E30" (PDE), "P41" (PUMA HT-TE, MPD), "F30" (ADP) appears on the fuel dispenser display
It is the error message of the fuel dispenser which notifies zero fuel price. • If the fuel dispenser is operated separately (without being controlled by the computer), then the unit price is set badly. *The price must differ from zero !* • If the fuel dispenser is controlled by the computer, then check setting of unit fuel prices in the computer. During each operation of dispensing the fuel price is sent automatically from the computer to the fuel dispenser.
NOTES:

Table 21 - WHAT TO DO IF ....